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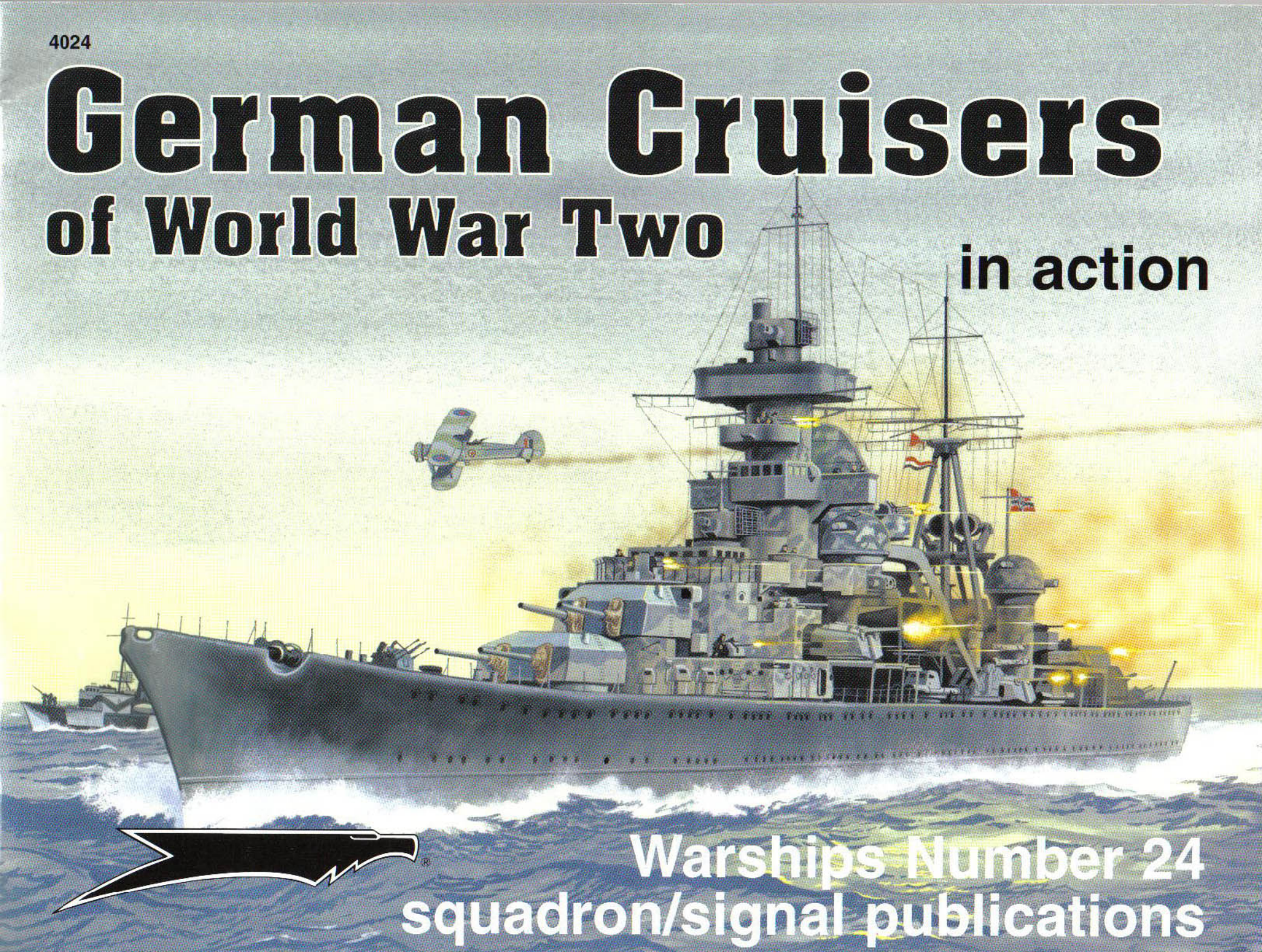
German Cruisers of World War Two in action



Warships Number 24

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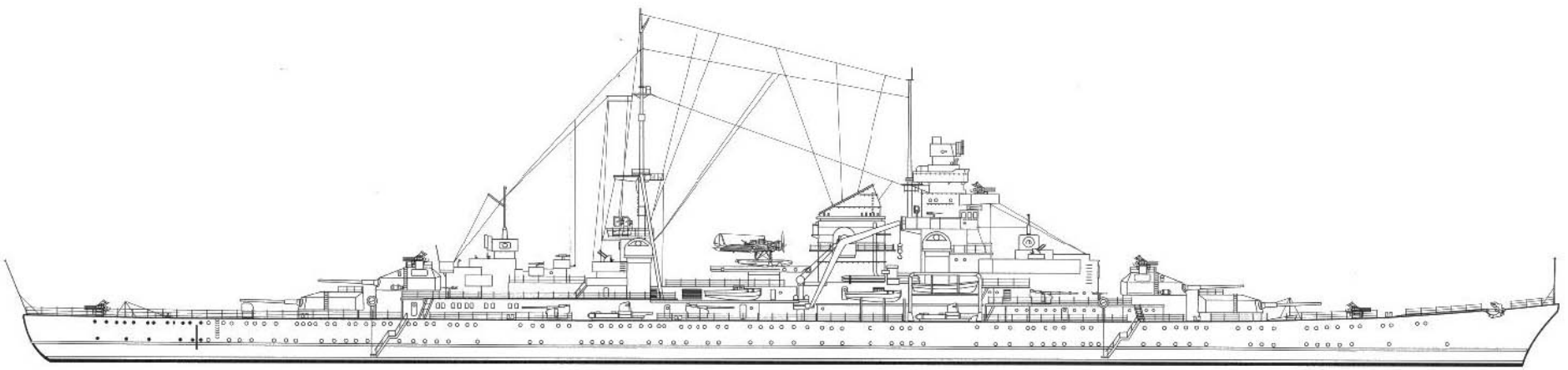
German Cruisers of World War Two in action

By Robert C. Stern

Color by Don Greer and David Gebhardt

Illustrated by Darren Glenn



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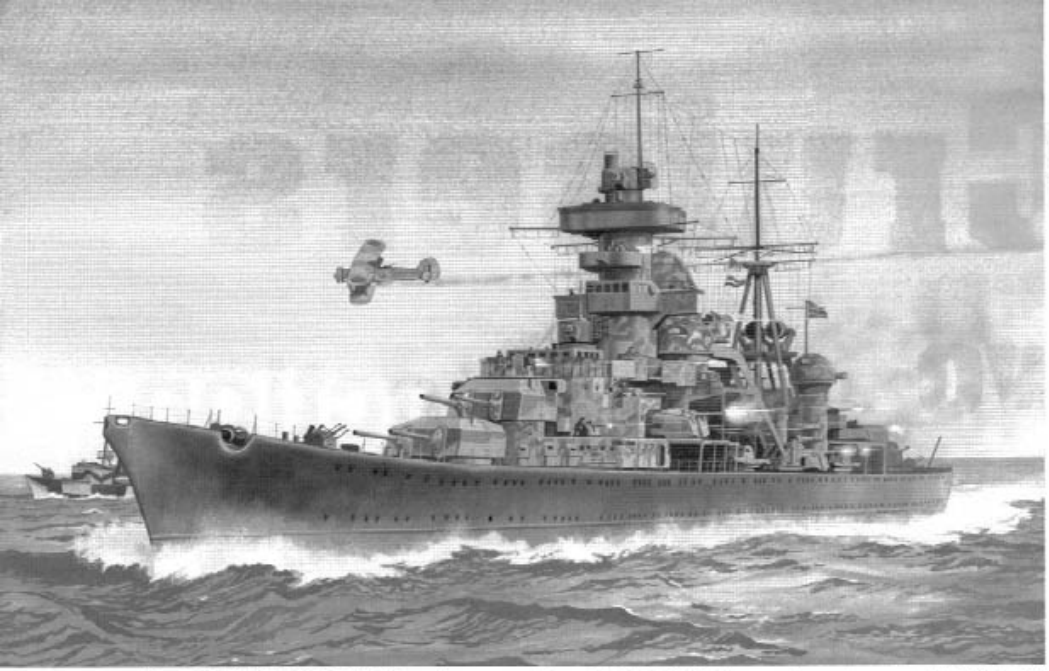

The ADMIRAL HIPPER Class heavy cruiser PRINZ EUGEN repels a piecemeal British air attack in the English Channel on 12 February 1942. She and the battleships SCHARNHORST and GNEISENAU dashed from Brest, France to German waters during Operation CERBERUS. PRINZ EUGEN had a Dark Blue Gray mottle painted over her Medium Gray superstructure.

Acknowledgements

The photographs used in this book come from official government sources in four countries. The following abbreviations are used to indicate the source of the photographs:

NARA	US National Archives & Records Administration
NHC	US Navy – Naval Historical Center
BAK	*Bundesarchiv* – Koblenz
ECPA	*Établissement Cinématographique & Photographiques des Armées*
PAC	Public Archives of Canada

All these photos were, with a few exceptions, originally shot by German military photographers, but at war's end, the originals passed into Allied hands. Most have been returned to Germany in the years since, though copies can in many cases also still be found in other archives. In cases when I have acquired the same photograph from multiple sources, I have credited the source most accessible to American researchers. In some small number of cases, photographs were supplied to me by individuals and I am not aware of the original source. These I have indicated by an attribution of the form 'Via XXX.' In an even smaller number of cases, I failed to record or never knew the original attribution. These I have left without attribution.

The Internet is becoming an increasingly useful resource to those interested in the history of this period. I have made use of the following sites and recommend them (with the normal cautions about questioning all identifications and verifying all facts):

http://history.navy.mil/index.html
http://www.warships1.com/
http://www.schlachtschiffe.de/
http://www.german-navy.de/information/index.html

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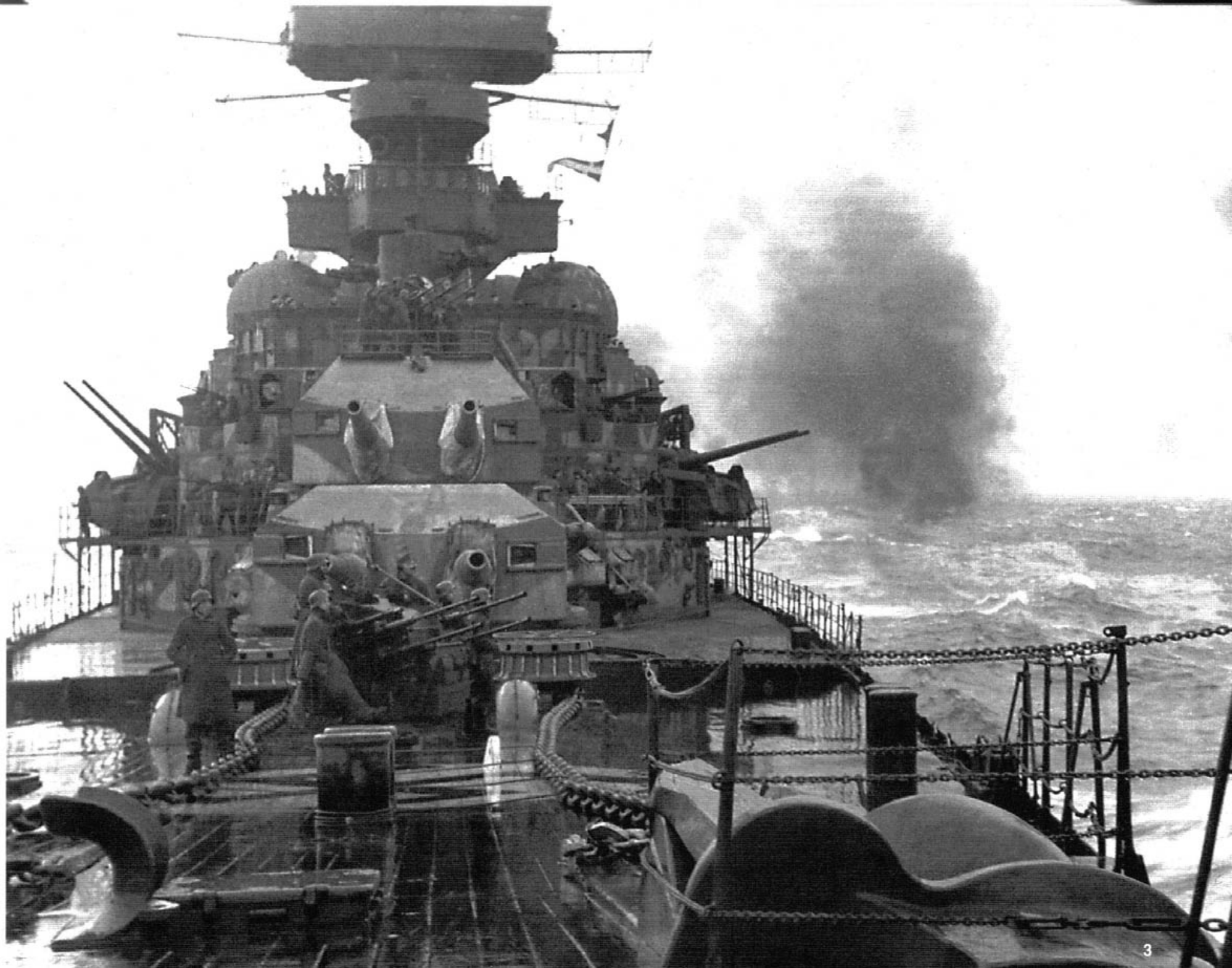
PRINZ EUGEN's port heavy *Flak* (*Flugzeugabwehrkanone*; Anti-Aircraft Gun) battery fires on attacking British aircraft in the English Channel during Operation CERBERUS on 12 February 1942. Heavy 10.5 cm (4.1-inch) guns in twin mounts flanked PRINZ EUGEN's forward superstructure, while twin 3.7 cm cannon were located above and inboard of the 10.5 cm weapons. PRINZ EUGEN temporarily carried five Army 2 cm quad mounts for CERBERUS. These mounts included one each on the forecastle and atop the B (*Berta*) main battery turret. (NARA)



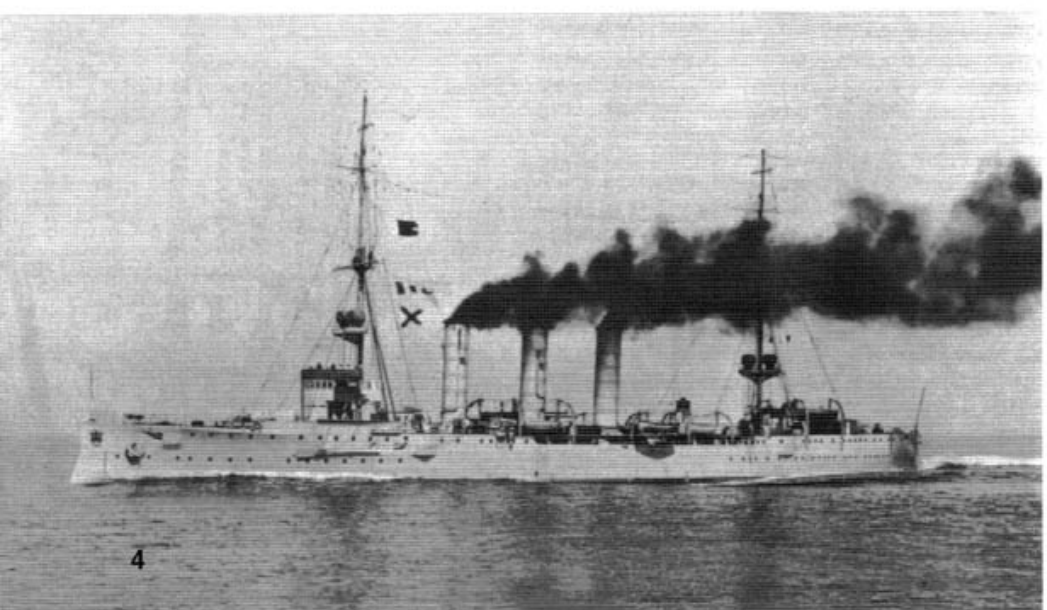
Introduction

Capital ship evolution was reasonably straightforward during the 19th Century. Steam power replaced sails, metal hulls replaced wood, and a small number of breech-loading rifles replaced a much larger number of smoothbore muzzle-loaders. This was partly because the line-of-battle ships' role remained simple: to be part of a fleet of similar ships capable of defeating any enemy's fleet of battleships. The evolution of cruising ships was far more complex, with many different, often parallel lines of development.

The cruisers that fought in World War Two descended from sail-powered frigates. These vessels were designed for long-range independent operation to gain information about the movement of an enemy's fleet, to raid an enemy's commerce, or to track down and defeat an enemy's commerce raiders. This led to the famous frigate vs. frigate duels of the American Revolution and the War of 1812, in which the advantage generally went to the Americans. This was due to the stouter construction and slightly larger guns of their frigates, including USS CONSTITUTION, better known as 'Old Ironsides.' Generally, a successful cruiser was a ship possessing high endurance and enough speed to outrun anything bigger, enough power to defeat anything its own size. It also had enough protection to survive encounters with any number of smaller units without disabling damage.

Meeting this set of requirements with steam-powered metal ships was far more difficult than with wind-powered wooden ships. High-speed from a steam engine can only be achieved at the expense of range. Unlike sail powered ships, whose range was limited only by the amount of food and water carried for its crew, steam-powered warships consumed coal or oil at rates directly related to the ship's speed. The more armor and armament a ship carried, the more fuel it took to achieve a particular speed. Even at most economical consumption rates, a cruiser-sized ship could never achieve the independence of operation synonymous with the frigates they replaced, without the ability to refuel at regular intervals. This led to the development of networks of coaling stations in all the places a navy might expect to operate and points in between. Colonial expansion before the advent of steam had concentrated on sources of wealth, including the gold of South America and the spices of India and the East Indies. Now parts of the world that had previously been of little interest – including the coast of Africa and Pacific islands – became the objects of intense competition between expansionist colonial powers. This competition led directly to World War One.

SMS (*Seiner Majestät Schiff*; His Majesty's Ship) EMDEN was a light cruiser launched in 1908. She displaced 3650 tons and was armed with ten 10.5 CM (4.1-inch) guns. EMDEN raided Allied shipping and installations in the Pacific and Indian oceans before she was sunk by the Australian cruiser HMAS SYDNEY on 9 November 1914.



In the years leading up to World War One, cruiser evolution followed several lines of development. Designers had attempted to overcome the problems imposed by competing demands for speed, endurance, power, and protection. Technological advances helped: lighter, stronger steel replaced iron; more efficient turbines replaced reciprocating engines; and oil replaced coal for fuel. Despite these advances, it proved impossible to build a ship that had all the desired characteristics of a cruiser and compromises were made. This led to two main cruiser types by the 19th Century's end, with each type optimized for a different set of features. Armored cruisers were larger, carrying bigger guns and more armor, sacrificing speed and particularly range. At the other extreme were protected cruisers, carrying smaller guns and having only an armored deck over the mid-part of the hull, but possessing greater speed and endurance. In the final run up to World War One, interest in armored cruisers declined as the type morphed into far larger battlecruisers, but protected cruiser development led to the highly successful light cruisers of the British Royal Navy and the *Kaiserliche Marine* (Imperial German Navy). On the German side, light cruiser development culminated in the wartime KÖLN Class. These were excellent ships of 5600 tons, eight 15 CM (5.9-inch) guns, 63.5MM (2.5-inch) belt armor and geared turbines capable of 29 knots (33 MPH/54 KMH).

World War One's end in 1918 brought light cruiser development to an end, and not just in Germany. The surrendered German High Seas Fleet was interned at the British naval base at Scapa Flow in the Orkney Islands just north of Scotland. On 21 June 1919, the German crews at Scapa Flow scuttled their ships in protest to what they considered to be the harsh terms of the Versailles Treaty[1]. All modern German light cruisers not scuttled at Scapa Flow in 1919 were parceled out as reparations to the victorious Allies. The Versailles Treaty left the Germans with a rump fleet, composed of the oldest, least threatening units still afloat at the war's end. The postwar *Reichsmarine*[2] was limited to 36 warships, including six old protected cruisers. The most modern of these cruisers were HAMBURG and BERLIN, each laid down in 1903. In keeping with the spirit of the treaty, which clearly intended to render Germany incapable of offensive action, none of these cruisers could be replaced before 20 years of service. To restrict Germany even further, any ship built to replace them was limited to 6000 tons displacement and 6-inch (15.2 CM) armament. It was to these limits that the light cruiser **EMDEN** was designed when it came to plan the first of the allowed replacement cruisers in 1923.

While EMDEN was being built and the next three replacement cruisers of the **'K' Class** were being designed, the standard of cruiser design evolved rapidly in the rest of the world. The victorious powers (Britain, the US, France, Italy, and Japan) attempted to prevent a new naval arms race by convening an arms limitation conference in Washington in 1922. The resulting Washington Naval Treaty limited new cruisers to 10,000 tons (10,161 MT) and 8-inch (20.3 CM) main guns. Cruisers of this size and power were actually larger than any that had been built after World War One and set a new standard for large cruisers, soon named 'heavy cruisers.' They clearly outmatched anything the Germans could build within the Versailles Treaty's limits.

The 1933 rise of Adolf Hitler and his Nazi Party increased pressure to figure out a way

[1]The Versailles Treaty imposed on Germany by the victorious Allies (primarily France, Great Britain, Italy, the United States, and Japan) was signed on 28 June 1919. This treaty formally ended World War One between these parties.

[2]The *Kaiserliche Marine* (Imperial German Navy) was renamed the *Reichsmarine* (Reich Navy) on 1 January 1921. The *Reichsmarine* was renamed the *Kriegsmarine* (War Navy) on 21 May 1935.

around those treaty restrictions. The Germans built the 'K' Class and the subsequent **LEIPZIG** and **NÜRNBERG** somewhat larger than actually allowed under the letter of treaty rules. This was also the case with the Allies' so-called Treaty Cruisers. Still, these German ships were far from matching the ships being built by the other powers. Only a complete abrogation of the treaty restrictions would solve the problem, and this was exactly what Hitler achieved with the 1935 Anglo-German Naval Agreement. That treaty's terms allowed Germany to build ships of all types up to 35 percent of the tonnage of each type in the Royal Navy. The Germans generally agreed to follow the size limits in the various arms restriction treaties, but got the British to concede that they should be allowed to use every ton they were entitled to, even if that meant exceeding the tonnage limits for individual ships. Having reached this agreement with one of the Versailles powers, the Germans had effectively nullified the terms of that treaty. Theoretically, the other Versailles powers could have objected and tried to persuade or force the British to undo the agreement. In reality, any semblance of unity among the five powers – Great Britain, the United States, Japan, France, and Italy – was a thing of the past.

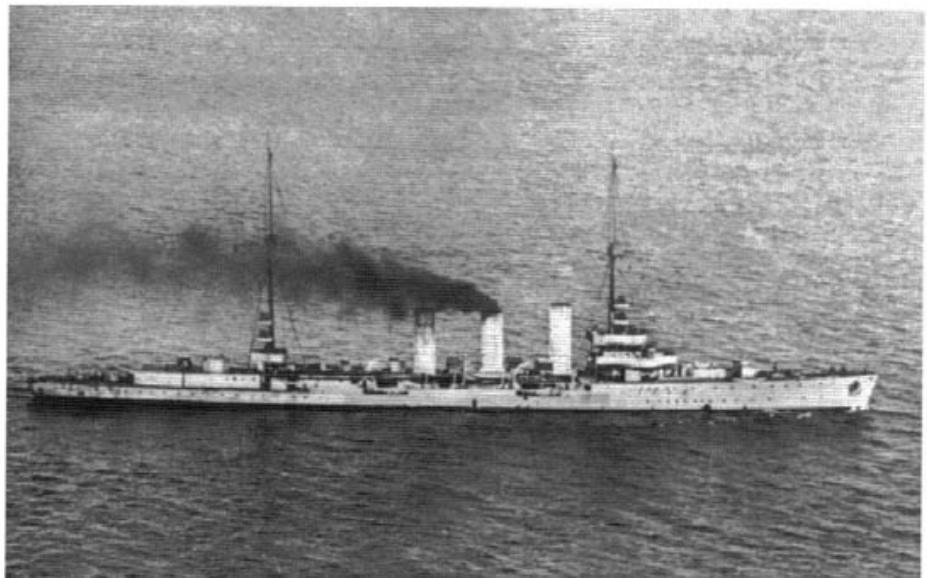
This agreement came too late to affect the parameters of any of the six replacement light cruisers, but the Germans rapidly announced their intent to build five more cruisers up to the limit of 56,640 tons. The first two, they announced, would be the **ADMIRAL HIPPER Class** heavy cruisers of 10,000 tons each; the other three would be larger to use up the remaining allowable tonnage. The first two became **ADMIRAL HIPPER** and **BLÜCHER**, but only one of the second group – **PRINZ EUGEN** – was completed. **SEYDLITZ** was 95 percent complete when construction was halted in 1942 and plans quickly developed to convert her to an aircraft carrier, although all work halted at the beginning of 1943. **LÜTZOW** was less complete when sold to the Soviets – under the terms of the 1939 German-Soviet Non-Aggression Pact[3] – in April of 1940. It had one intact turret, which the Soviets used to fire on the advancing Germans on the Leningrad front in 1941.

[3]On 25 August 1939, German Foreign Minister Joachim von Ribbentrop and Soviet Foreign Affairs Commissar Vyacheslav Molotov signed a Non-Aggression Pact between their countries. This treaty was in effect until German forces invaded the Soviet Union on 22 June 1941.

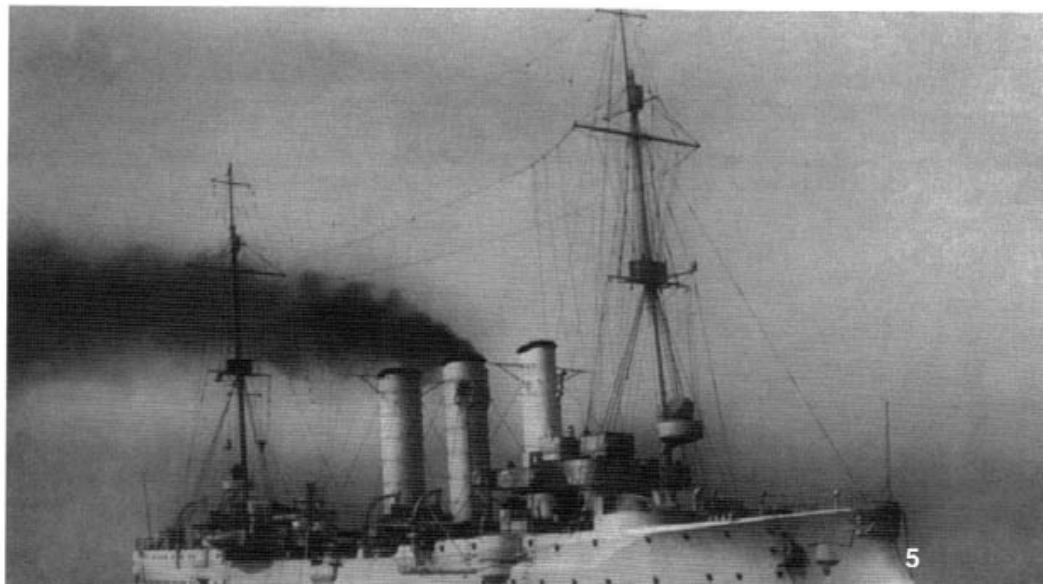
None of the *Kriegsmarine's* cruisers had particularly successful careers, with the possible exception of ADMIRAL HIPPER, which did have one highly profitable sortie into the Atlantic. The six light cruisers saw limited action, at best. Two of them, along with one of the three heavy cruisers, were lost during the invasion of Norway in April of 1940. The surviving light cruisers mainly served in the Baltic Sea for the rest of the war, training cadets and trying – unsuccessfully – to slow the Soviet advance through the Baltic States (Estonia, Latvia, and Lithuania) and East Prussia. The surviving heavy cruisers had far more active careers. PRINZ EUGEN accompanied the battleship BISMARCK on her famous, but ill fated, 1941 sortie into the Atlantic Ocean. It ran through the English Channel with the battleships SCHARNHORST and GNEISENAU, much to the embarrassment of the British. ADMIRAL HIPPER saw the most action, including two independent sorties into the Atlantic and others into the Barents Sea. In the long run, even this relative success was a minor sideshow in the global conflict.

The ambitious 'Z' Plan of 1938 called for 800 new surface craft, including 23 cruisers and 22 *Spähkreuzer* (Scout Cruisers, large destroyer leaders). Even if war had not broken out in 1939 and this Plan had been completed, it would have made little difference. The *Kriegsmarine* leadership completely misunderstood air power's importance in future naval conflicts. Nevertheless, designs were finalized for a new class of light cruisers intended to improve dramatically on the earlier cruiser designs. These cruisers were designed with far greater range than the earlier light cruisers. These vessels were to be armed with four twin 15 CM (5.9-inch) turrets of the type mounted as secondary armament on the BISMARCK Class. Two (possibly three) of the planned light cruisers were actually laid down in 1938 and 1939, but all were broken up before launch. The first *Spähkreuzer* keel was laid down in August of 1941, but she was broken up before much work had been completed.

The light cruiser SMS KÖLN was built between 1915 and 1918. This 5600-ton vessel was armed with eight 15 CM (5.9-inch) guns. KÖLN entered service just before the Armistice of 11 November 1918 and never saw action. Surrendered to the British, she was scuttled by her crew at Scapa Flow on 21 June 1919.

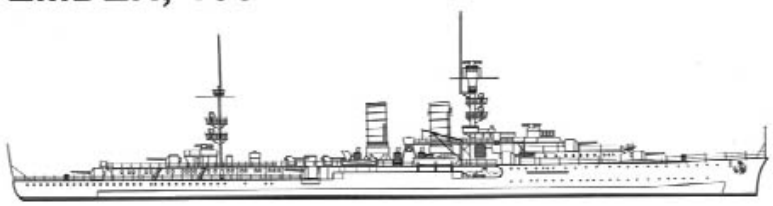


The BREMEN Class light cruiser HAMBURG was one of the old cruisers the *Reichsmarine* was allowed to retain in service after World War One. She was launched in 1903 and became a training ship in 1926. HAMBURG was armed with ten 10.5 CM (4.1-inch) guns and had a displacement of 3250 tons.

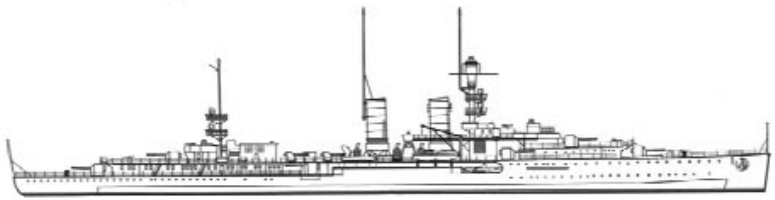


Development

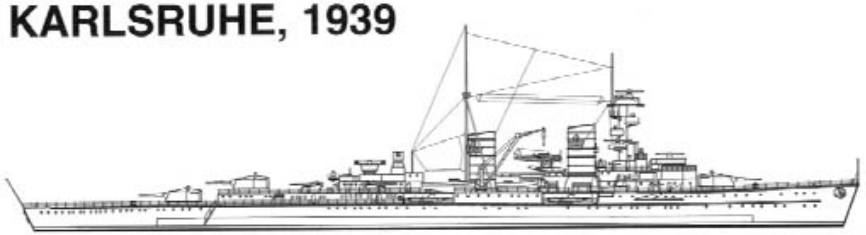
EMDEN, 1931



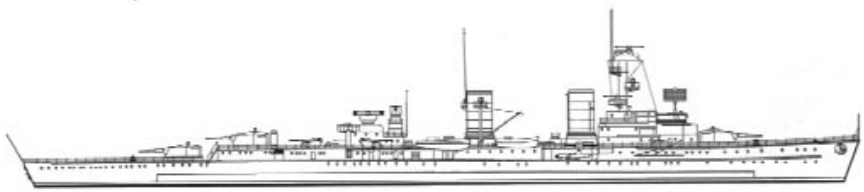
EMDEN, 1942



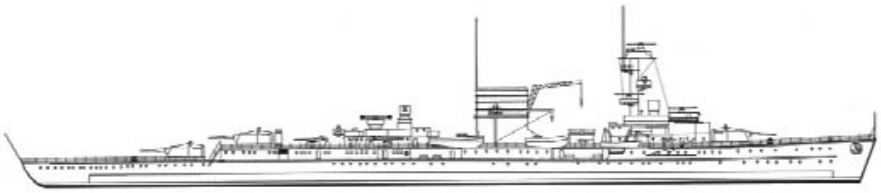
KARLSRUHE, 1939



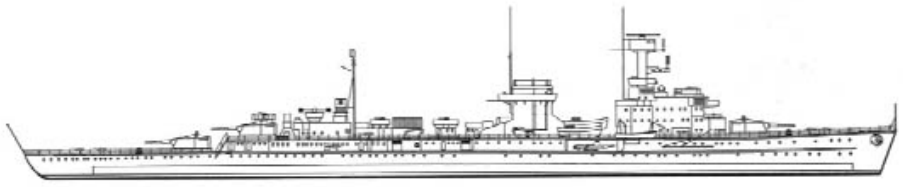
KÖLN, 1942



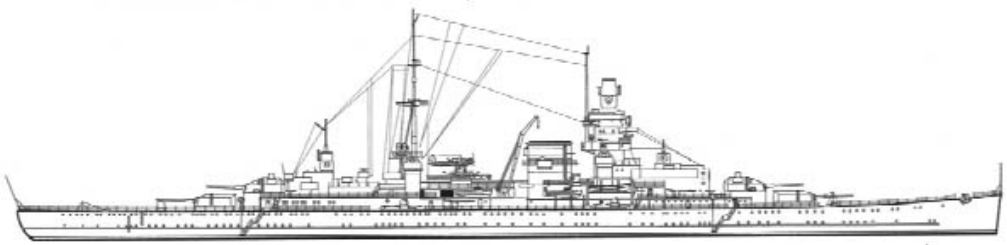
LEIPZIG, 1940



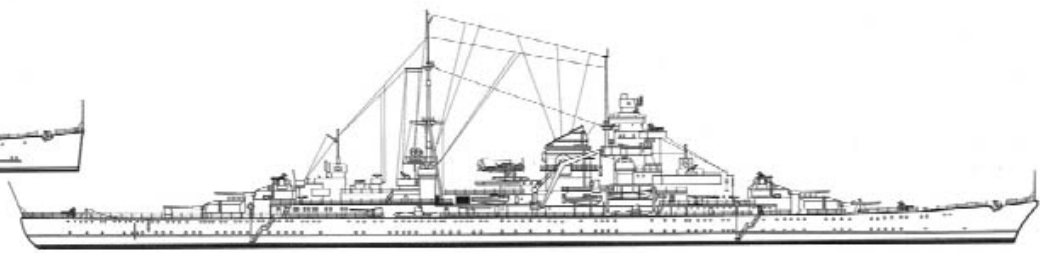
NÜRNBERG, 1945



ADMIRAL HIPPER, 1939



PRINZ EUGEN, 1942

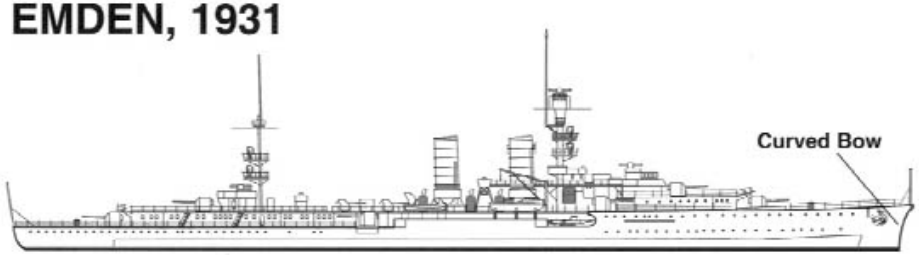


EMDEN

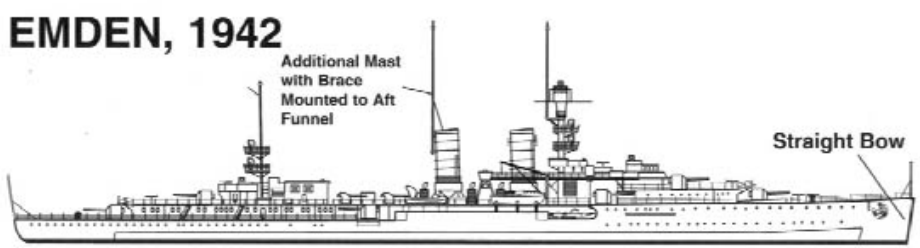
When the *Reichsmarine*'s naval architects began designing a cruiser to replace the oldest of the six antique cruisers allowed under the Versailles Treaty, it was only natural they would fall back on their last successful design. The cruiser dubbed Cruiser 'A' ('ERSATZ NIOBE') was for all intents a slightly updated repeat of the KÖLN Class light cruisers that were being built at the end of World War One. (Only two of this class were completed and only KÖLN had actually entered service before the Armistice. Both of these were interned at Scapa Flow and both were scuttled there on 21 June 1919. Five more had been launched, but were incomplete at war's end, and three more had not yet been launched and were scrapped on the building slips.) When the decision was made to proceed in 1920, plans were rapidly generated. The Allied Control Commission (ACC), as required by the Versailles Treaty, approved these plans and construction orders were delivered to the Navy Yard at Wilhelmshaven in April of 1921. (Another treaty provision was that German commercial yards were not allowed to build warships.)

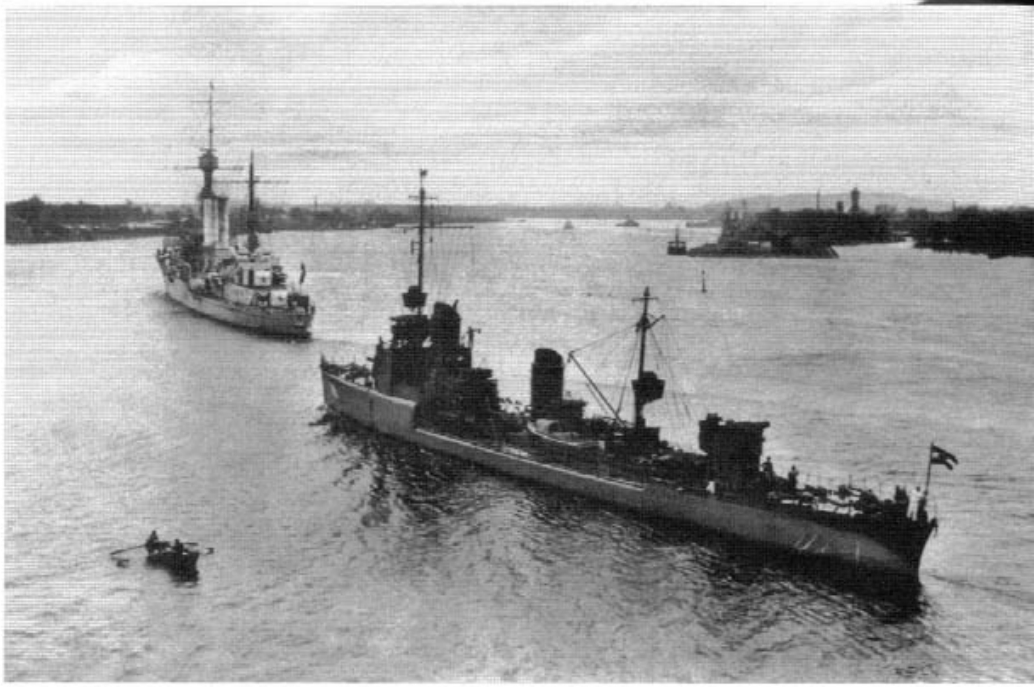
It was only after work had started on the new cruiser that the *Reichsmarine* discovered that their planning was based on two incorrect assumptions. The first was that the Germans were using metric tons (MT, or tonnes) in determining displacement, while the ACC was using English tons (long tons). (A long ton equals 2240 pounds; a tonne equals 1000 KG, which equals 2204.6 pounds; an American ton [short ton] equals 2000 pounds. In the rest of this document, the word 'ton', if used without modification, refers to the short ton.) Thus, the ACC took the treaty's specified displacement limit to mean 6000 long tons, which translates to 6096 tonnes (6720 tons). Even more significant was that the ACC was using the Royal Navy's definition of standard displacement, which excludes the weight of fuel or feedwater, while the German definition includes the weight of 40 percent of these consumables. The net effect of these two misunderstandings on the part of the Germans was that the final design they submitted for the new cruiser was seen by the ACC as displacing 5280 long tons, only 88 percent of the allowed displacement.

EMDEN, 1931



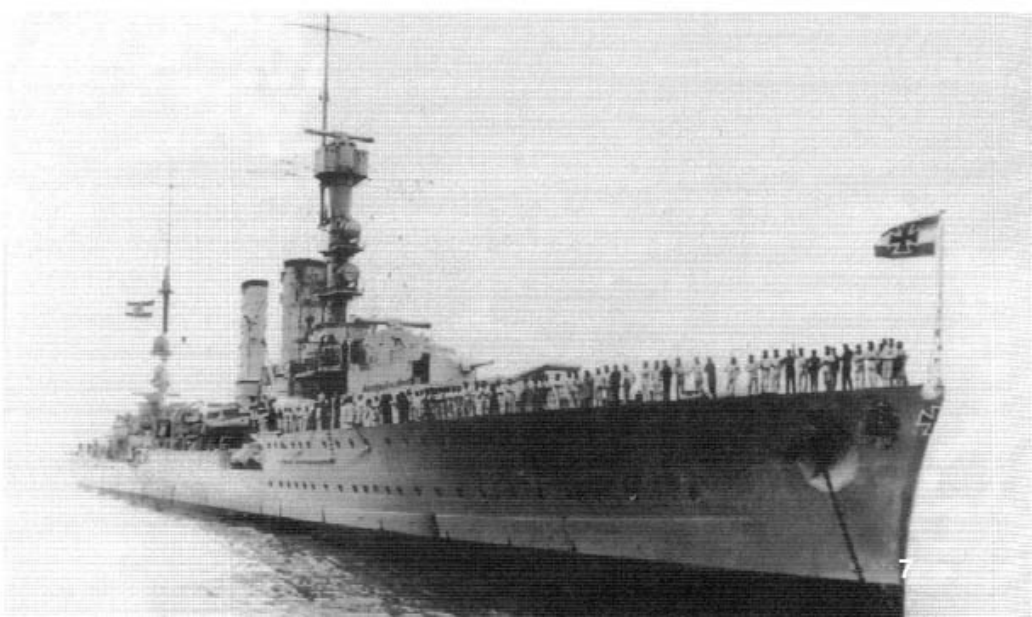
EMDEN, 1942

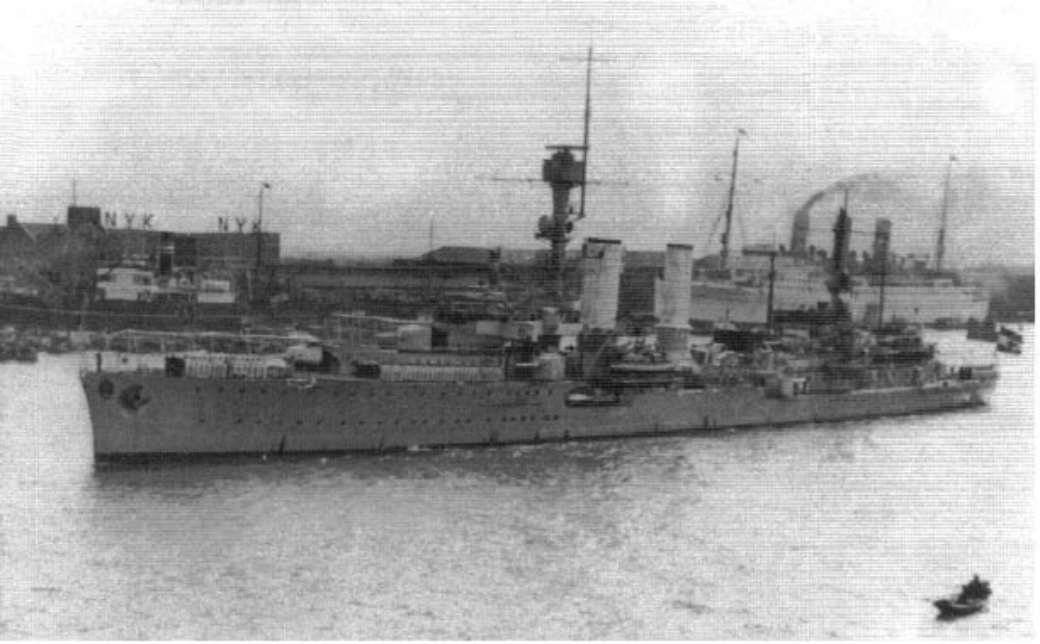




The light cruiser EMDEN departs Swinemünde (now Swinoujscie, Poland) harbor for training duties in the Baltic Sea in the mid-1920s. She is accompanied by one of the prewar torpedo boats allowed the *Reichsmarine* by the 1919 Versailles Treaty. EMDEN was the pride of the German fleet during this period.

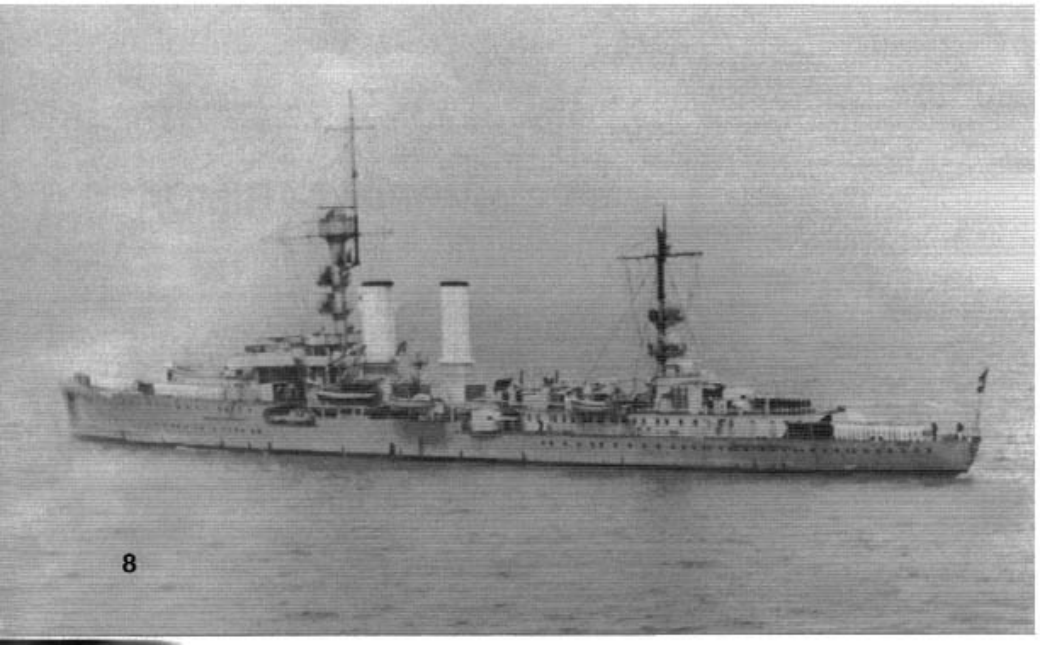
EMDEN makes a port call at Honolulu, Hawaii in 1939. She flies the *Reichsmarine* ensign from her bow and mainmast. This flag was horizontally striped Black (top), White, and Red, with a large Black and White *Eisenkreuz* (Iron Cross) at its center. Another *Eisenkreuz* is painted on EMDEN's bow, while plaques with her namesake city's coat-of-arms are mounted on either bow side. (NHC)





EMDEN's crew lines the rails as she leaves Shanghai, China harbor in 1931. This was on another of her extended training cruises, which took EMDEN and her crew far from German waters. Her hull is painted *Schiffstarnfarbe 31$_2$ Dunkelgrau* (Ship's Camouflage Color 31$_2$ Dark Gray), while her superstructure is *Schiffstarnfarbe 31$_1$ Hellgrau* (Ship's Camouflage Color 31$_1$ Light Gray). (NHC)

EMDEN steams out of Shanghai in 1931. Her funnels are *Wasserfarbe 95 Hellgrau* (Water-Based Color 95 Light Gray), which was also called *Emulsion 95*. This color was almost White in appearance. A Black band is at the funnels' top. EMDEN's masts were painted Black where they might be stained by smoke from the funnels. (NHC)



The *Reichsmarine* immediately attempted to revise the design to take advantage of the available tonnage. They proposed replacing the eight single 15 CM (5.9-inch) mounts with four twin turrets, all on the centerline, and doubling the number of torpedo tubes from four to eight. The ACC rejected these changes and, reluctantly, the *Reichsmarine* reverted to the original design. Although her keel was laid on 8 December 1921, the final drawings weren't delivered to the yard until February of 1922. The new cruiser was named EMDEN when she was launched on 7 January 1925. She had a standard displacement of 5608 long tons (6281 tons/5698 MT). EMDEN was commissioned into the *Reichsmarine* on 15 October 1925.

The only significant differences between EMDEN and the wartime KÖLN was the extensive use of welding, the use of light metals where possible in place of steel, and the placement of the two forward gun mounts on the centerline where they had been side-by-side in the earlier design. It was estimated that using welding and light metals saved over 400 tons (363 MT) in the hull alone. This savings allowed EMDEN to reach the same speed as KÖLN with seven percent less power. It was estimated that it also added 20 percent to her range, but even with this extra endurance, EMDEN's range was a serious handicap, being only 6750 nautical miles (NM) (7773 miles/12,509 KM) at 14 knots (16 MPH/26 KMH).

EMDEN was 150.5 M (493 feet 9.2 inches) long at the waterline and 155.1 M (508 feet 10.3 inches) overall. She had a beam of 14.3 M (46 feet 11 inches) and a draft of 5.4 M (17 feet 8.6 inches) at standard displacement and 5.9 M (19 feet 4.3 inches) at full load. In mid-1938, a straight, slightly raked stem replaced EMDEN's original curved bow. This did not change either the waterline or overall length. Her full load displacement during World War Two was approximately 6990 tons (6341 MT).

EMDEN was originally equipped with ten Schulz boilers, six of which were oil-fired and four coal-fired. This was justified in the original intention that EMDEN was to be a training ship. In this role, she was expected to make long voyages to places where oil might not be available. She had two sets of Brown-Boveri geared turbines driving two screws. This machinery gave a design output of 45,900 SHP and a maximum speed of 29.4 knots (34 MPH/54 KMH). EMDEN was reboilered in 1933-34, the four coal-fired units being replaced by oil-burners. This increased power by 600 SHP, but had no effect on her speed or range.

EMDEN's belt armor had a maximum thickness of 50MM (1.97-inch). Her 20MM (0.79-inch) thick horizontal armored deck was doubled in thickness over the magazines. The armor used in EMDEN was the best then available, a combination of Krupp Cemented (KC) face-hardened and Krupp Non-Cemented (KNC) homogeneous chromium steel.

Her basic complement was 483, which included 19 officers and 464 other ranks. Up to 160 cadets were onboard for a training cruise.

EMDEN's main battery consisted of eight 15 CM 45-caliber naval rifles in C/16 single mounts. These were mounted four on the centerline – two forward, two aft, superfiring – plus two on each beam. (All German 15 CM guns had an actual bore of 14.91 CM/5.87 inches.) They fired 45.3 KG (99.9-pound) shells at 835 M (2740 feet) per second to a maximum range of 9.07 NM (10.4 miles/16.8 KM) at a rate of between four and five rounds per minute. (This was a slow rate of fire for a gun of this size, due to the separate shell and powder cartridge, and also to the semi-enclosed mounts, which were notoriously difficult to man in wet weather.) There was talk in the late 1930s of replacing the single mounts with four of the fully enclosed twin-mounts being developed for the large *Typ* (Type) 36A destroyers, but delays in the mounts' development led to that plan being shelved. In 1942, EMDEN was rearmed with a gun developed for the *Typ* 36A destroyers, but it was again in semi-enclosed single mounts rather than twin-mounts. These were 15 CM (5.9-inch) 55-caliber naval rifles in C/36 single-mounts. These guns

fired the same shells as the older version, but reached a maximum range of 12.18 NM (14 miles/22.6 KM) due to the longer barrel and the greater elevation allowed by the mount. Even though the shell and powder were still separate, the rate of fire with the new mount was between seven and eight rounds per minute due to a better mount layout.

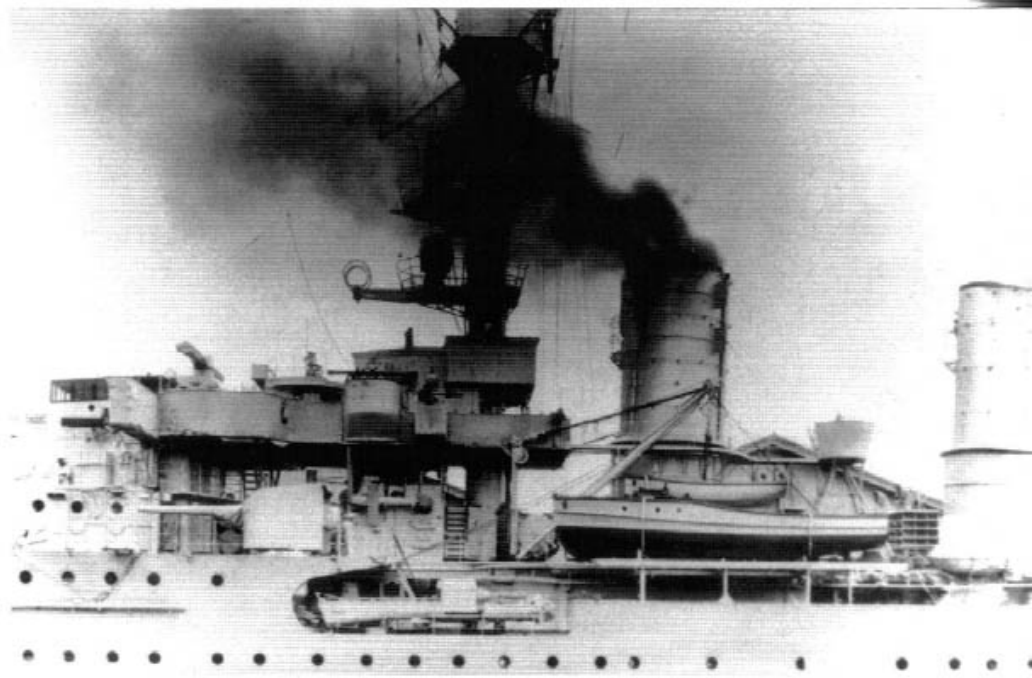
The secondary battery at launch was two single 8.8 CM (3.5-inch) 45-caliber C/16 mounts, plus four 2 CM (0.8-inch) cannon in single mounts. A third 8.8 CM mount was added in 1938. There are reports that two more single 2 CM weapons were also added during the 1930s. These single 2 CM mounts remained until 1944, when the *Flak* (*Flugzeugabwehrkanone*; Anti-Aircraft Gun) armament was increased until it reached a maximum of five 2 CM quad-mounts and two 3.7 CM (1.5-inch) twin-mounts.

EMDEN was launched with four 50 CM (19.7-inch) diameter torpedo tubes in twin mounts on the main deck. These were loaded with G7 torpedoes, which were 7 M (23 feet) long and weighed 1365 KG (3009 pounds). These could reach a maximum speed of 37 knots (43 MPH/69 KMH), but reached their maximum range of 5.08 NM (5.8 miles/9.4 KM) at 27 knots (31 MPH/50 KMH). The G7 carried a 195 KG (430-pound) Hexanite warhead. After the larger G7a torpedo became available in 1931, the older tubes were replaced, probably during the 1933-34 refit. The new torpedo had a diameter of 53.3 CM (21 inches) and was 7 M long and weighed 1528 KG (3369 pounds). It could reach a maximum speed of 40 knots (46 MPH/74 KMH), but had a maximum range of 7.66 NM (8.8 miles/14.2 KM) at 30 knots (35 MPH/56 KMH). Each G7a carried a 320 KG (705-pound) Hexanite warhead.

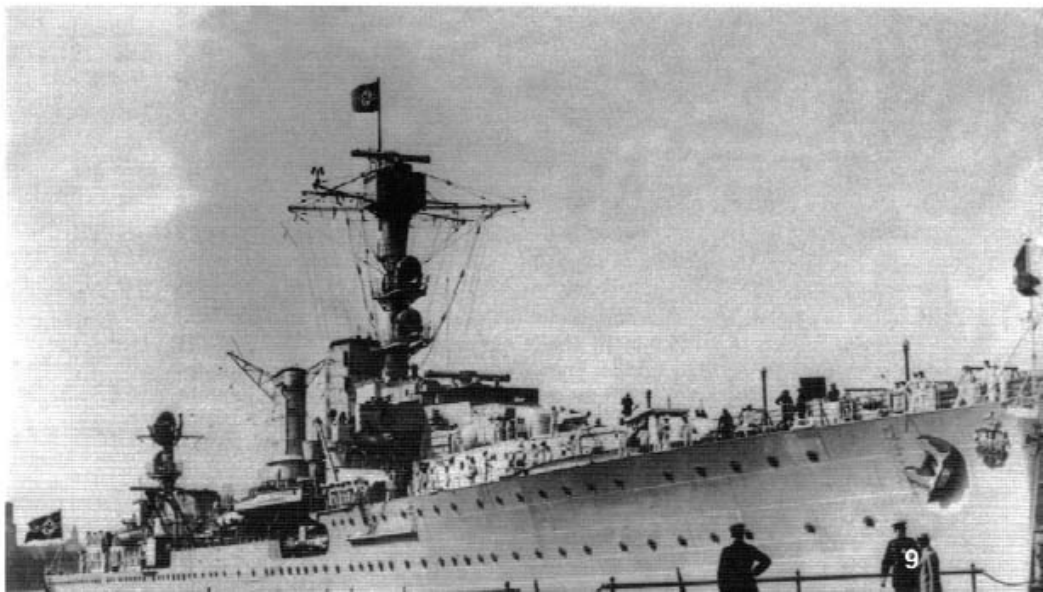
Main battery fire control was provided by three 6 M (19.7-foot) optical rangefinders, which were mounted on the fore and aft conning towers and on the foremast. In 1942, EMDEN received a FuMO 25[1] search radar. This radar used a mattress-type antenna 2 M (6 feet 6.7 inches) high by 6 M (19 feet 8.2 inches) wide. It was mounted in place of the lower searchlight on the forward face of the foremast.

EMDEN was understood from the beginning to be anachronistic and weak by any standard and was earmarked for training duties from her career's beginning. She was the first German warship primarily of welded construction and the first to make extensive use of lighter metals, which made her an experiment. It was one that was only partially successful. EMDEN proved to be a poor sea boat. Her narrow beam gave her marginal lateral stability and the light construction allowed the hull to flex too much, causing frequent tears in her shell plating. Later designs were beamier, but the Germans were committed to the lightweight construction techniques pioneered in EMDEN and the later light cruisers suffered from many of the same problems. Nevertheless, EMDEN was kept busy before World War Two, making nine major training cruises between 1926 and 1938, including three complete circumnavigations of the globe. At least two more of the cruises were intended to continue around the world, but as the 1930s progressed and word of Nazi racial policies got out, EMDEN became increasingly unwelcome in the Americas. She saw limited action during the war, but remained active well into 1945.

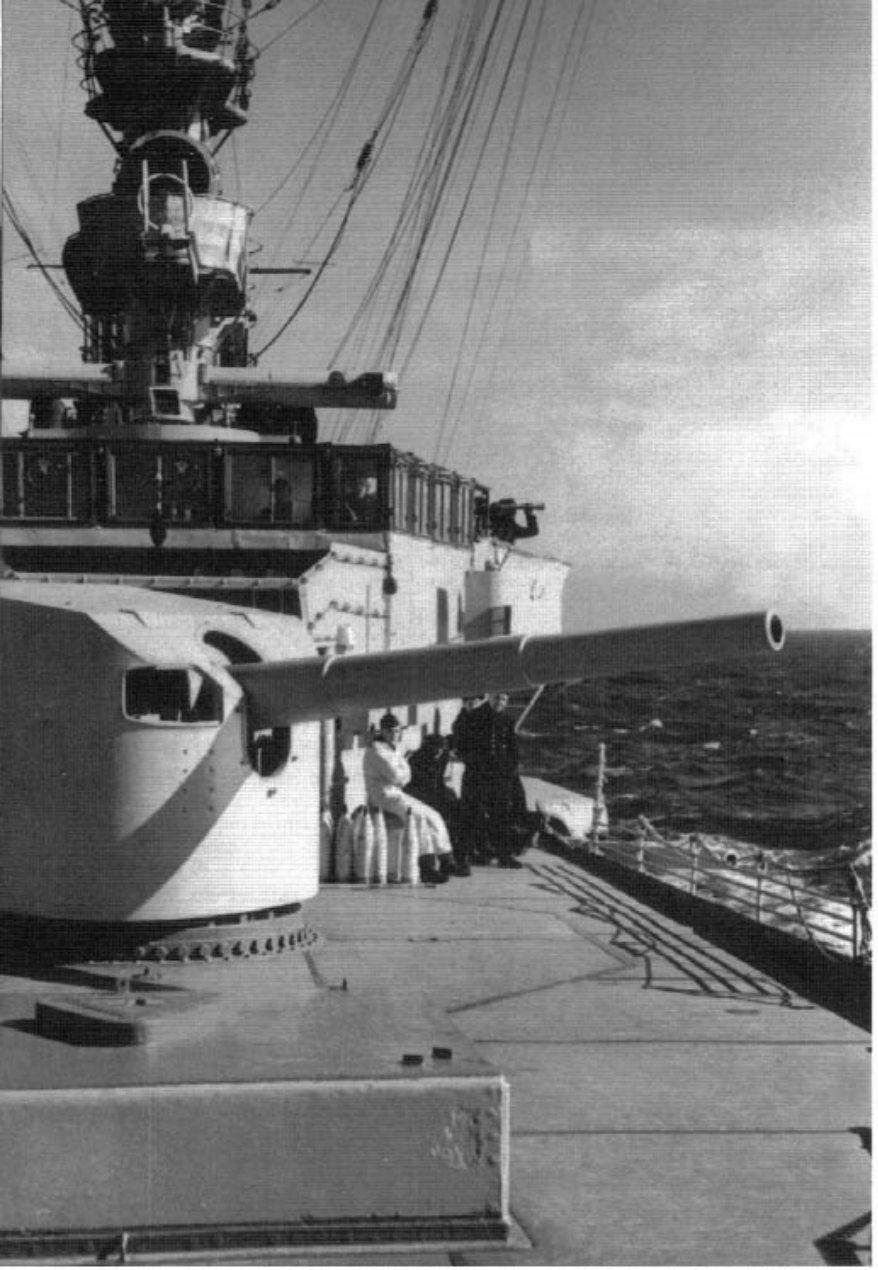
[1]FuMO: *Funkmess-Ortung*; Radio-Direction Finder, Active Ranging.



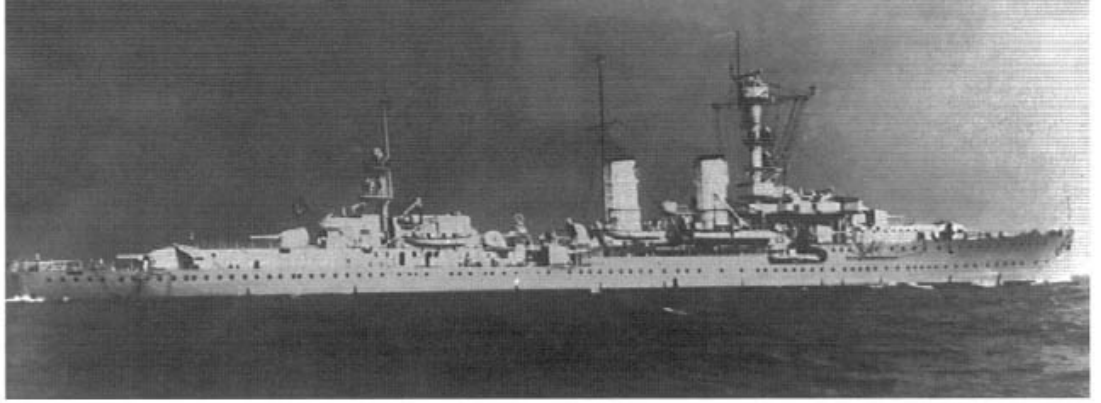
EMDEN's last visit to the United States was in 1936, when she made port calls at Honolulu (here) and along both the Atlantic and Pacific coasts. She's making considerable smoke, although her coal-burning boilers had been replaced with oil-fired units two years earlier. Another visible change was the shortening of her funnels by approximately 6 feet (1.8 M). The funnel tops now have a slight fore-to-aft slant, as can be determined by looking at the horizontal footrails circling the funnels. A small rangefinder for the *Flak* (anti-aircraft gun) battery is located on the near bridge wing, beside the main battery rangefinder and under the smoke plume. (NHC)



German warships began displaying Nazi symbols soon after that party came to power in early 1933. A large eagle and swastika plaque was added to EMDEN's stern during a major refit in 1934. From November of 1935, the *Kriegsmarine* ensign with its prominent black swastika replaced the horizontally striped *Reichsmarine* flag. Other changes resulting from the 1934 refit are visible in this 1936 view. These include adding two angled antenna spreaders aft of the after funnel and shortening the mainmast to a stub just tall enough to support two searchlight platforms. (NARA)



Crewmen with 15 CM (5.9-inch) shells stand to the right of EMDEN's B (*Berta*) mount, near her bridge. These men are awaiting the start of gunnery training. Because the 15 CM guns were mounted in single mounts instead of turrets, shells and the separate powder cases were brought up from the magazine through the bridge structure and carried across the deck to the guns. Shells like these would never be kept on deck for any length of time. (BAK)



A more conventional pole mast with cross-spars soon replaced the outriggers on the after funnel. Additionally, a short topmast was added to the stub mainmast. A third 8.8 CM *Flak* weapon was added at the same time. This view of EMDEN probably dates from 1937. (Via Bob Cressman)

EMDEN Battle History:

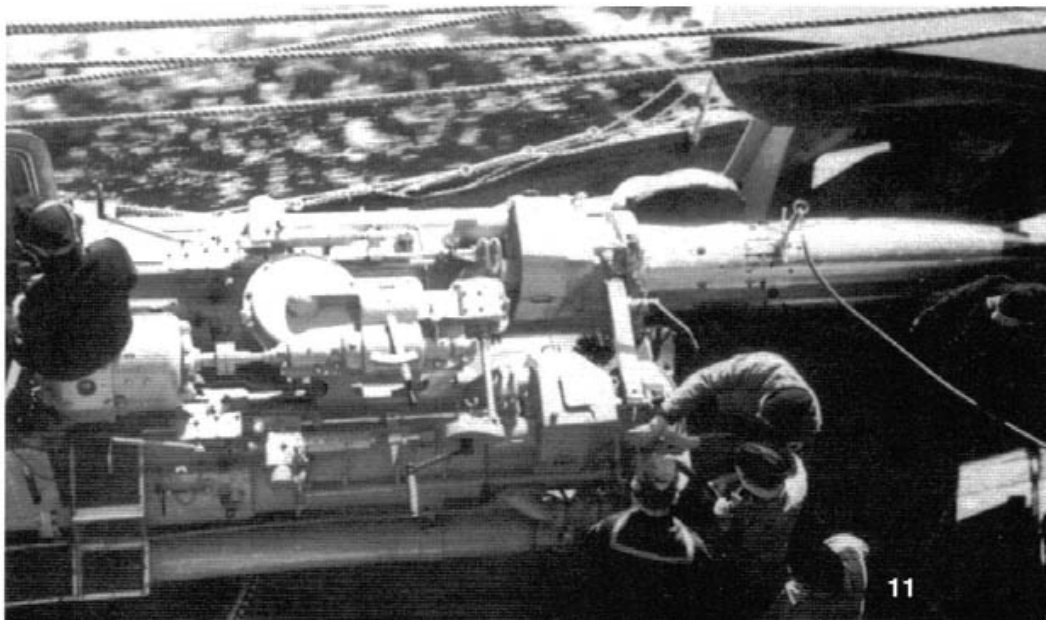
4 Sep 1939: Minor damage in British air raid near Wilhelmshaven, Germany. Nine crew members killed – first *Kriegsmarine* battle casualties.
Oct 1939-Mar 1940: Training duty
7 Apr 1940: Assigned to Group 5 (Oslo) of Operation WESERÜBUNG (WESER EXERCISE; invasion of Norway) with armored ship LÜTZOW and heavy cruiser BLÜCHER. Assembled at Kiel, Germany.
9 Apr 1940: After BLÜCHER sinks in Drobak Narrows, lands troops at Son, Norway.
10 Apr 1940: Passed narrows and docked at Oslo, Norway. Served as communications center.
Summer 1940: Training duties based at Gotenhafen (now Gdynia, Poland).
23 Sep 1941: Bombards Soviet positions on Sworbe Peninsula, Ösel (Saaremaa) Island, off Estonia
27 Sep 1941: With light cruiser LEIPZIG, sinks Russian MTB-83 in Lyu Bight.
Nov 1941: Attached to Fleet Training Squadron in the Baltic.
Jun-Nov 1942: Major refit at Wilhelmshaven.
Sep 1944: Flagship Commander-in-Chief Minelayers Baltic.
19 Sep-14 Oct 1944: Laid minefields in Skagerrak. Effort halted due to increasing air attacks.
10 Dec 1944: Ran aground escorting troopship in Oslofjord. Repairs at Schichau, Königsberg (now Kaliningrad, Russia).
25 Jan 1945: Towed to Pillau (now Baltiysk, Russia) due to Soviet attack on Königsberg. Carried coffins of Paul von Hindenburg and his wife to Pillau.
1 Feb 1945: One engine made operational. Loaded refugees and departed for Kiel.
6 Feb 1945: Arrived at Kiel. Docked at Deutsche Werke for further repairs.
11 Mar 1945: Damage to deck housing by incendiary bomb.
3 Apr 1945: Forward funnel destroyed by direct hit.
9 Apr 1945: Major British Royal Air Force (RAF) raid on Kiel. Stern damaged by near-misses.
13 Apr 1945: Serious bomb damage. 15° list to port.
14 Apr 1945: Towed to Heikendorf Bay.
26 Apr 1945: Grounded and decommissioned.
3 May 1945: Destroyed by scuttling charges.

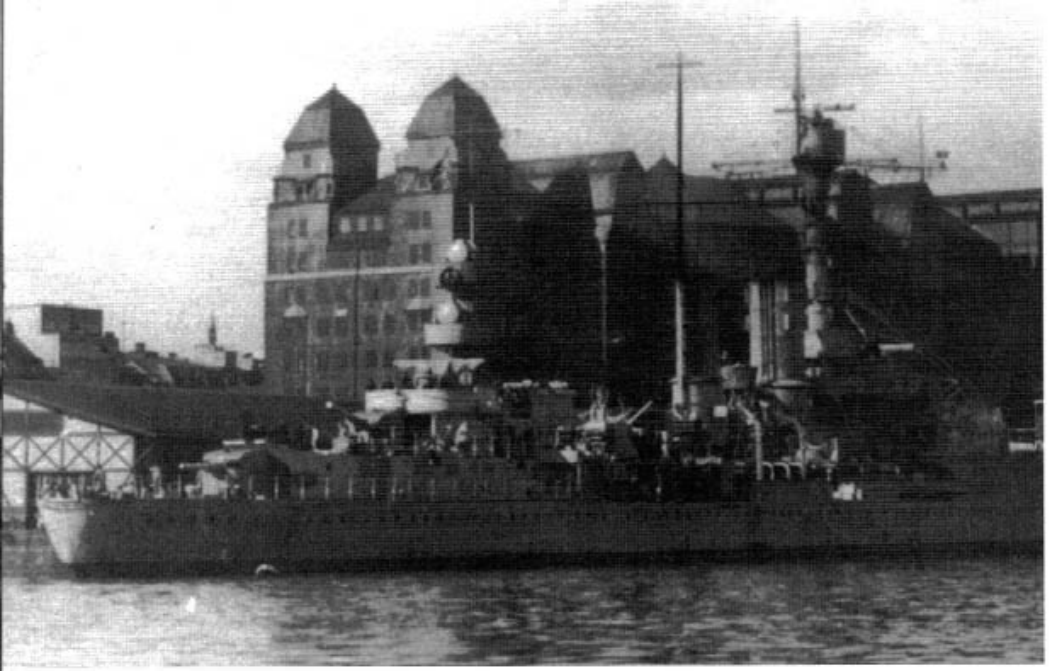
EMDEN is tied up in port, probably in 1938. The *Kriegsmarine* ensign is flown from her fantail while she is at anchor. A mooring line runs from EMDEN's aft deck to a mooring point off camera. A mast was added to the rear of her aft funnel during the 1930s. This mast helped support radio antenna cables that stretched between her fore and aft masts. (NHC)

EMDEN is tied up at a pier in the early weeks of World War Two. The plaques and Iron Cross at the bow were removed during the first days of the war. Degaussing cables around her hull were added during repairs in mid-September of 1939, are not yet present. EMDEN's straight, slightly raked bow replaced the earlier curved bow in mid-1938.

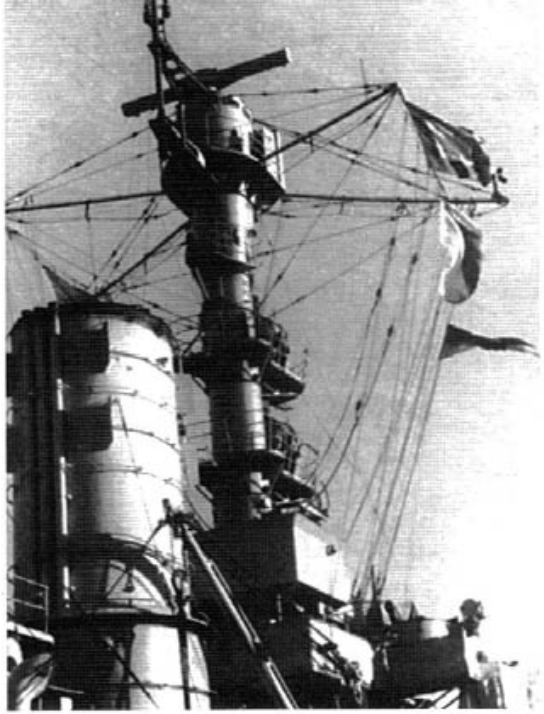
EMDEN exercises with the light cruiser KÖNIGSBERG in the Baltic Sea in early November of 1939. EMDEN wears the standard wartime paint scheme, Medium Gray hull and Light Gray upperworks. The official German names of these colors were *Dunkelgrau 51* (Dark Gray 51; RAL 7000) and *Hellgrau 50* (Light Gray 50; RAL 7001). These were neutral gray tones without a noticeable blue cast. Under certain lighting conditions, particularly if the paint had several months to fade, these colors were difficult to distinguish and ships would look like they were painted one color overall. (NARA)

Crewmen service one of EMDEN's paired 53.3 cm (21-inch) torpedo tubes. Two launchers were mounted on her main deck, one each to port and to starboard. A G7a torpedo is partially loaded into this launcher's right tube. The tubes were swung outward and aimed at its target before the torpedoes were launched. EMDEN was bound for Oslo to support the German invasion of Norway in April of 1940. (BAK)





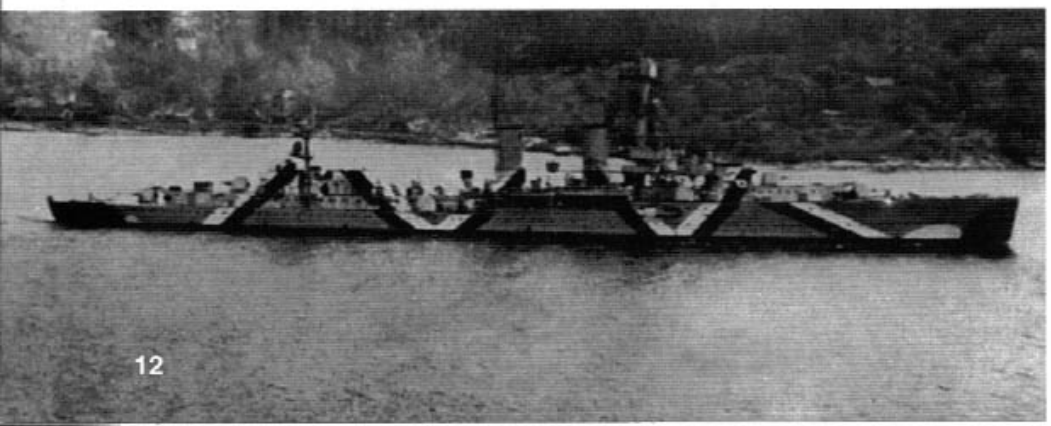
EMDEN is tied up alongside a wharf in Oslo in April of 1940. Two searchlights are mounted – one above the other – on her aft mast. A rangefinder for her two aft 15 CM (5.9-inch) guns is located below the lower searchlight platform. German warships had a boot topping of *Wasserlinienfarbe* (Waterline Color) *I 23a Grau* (Gray). This Dark Gray appeared similar to Black in most photographs. The boot topping was painted 1 M (3.3 feet) above and below the standard displacement waterline. (BAK)

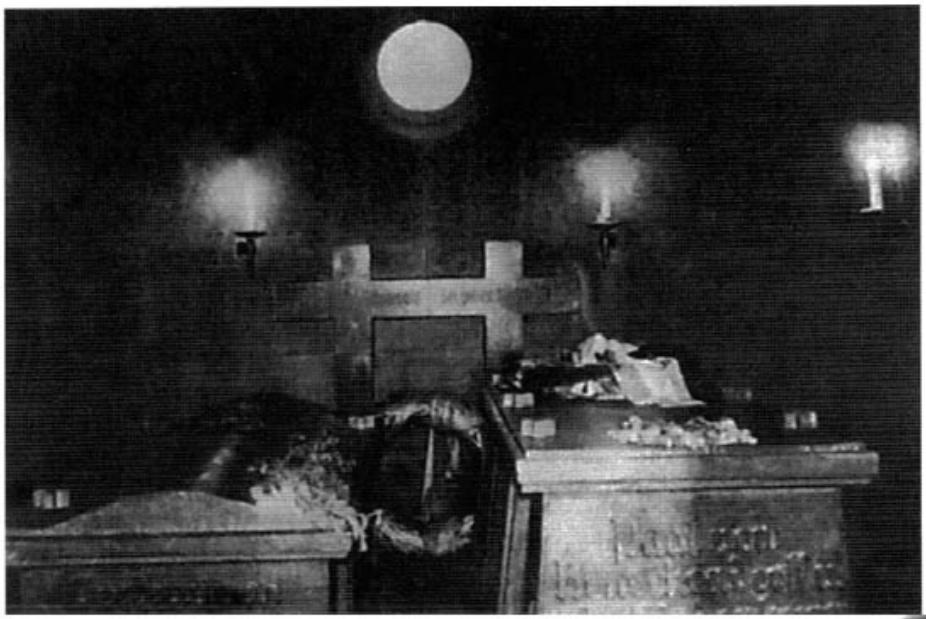


Signal flags fly from yardarms mounted to EMDEN's foremast. These flags were used for visual signaling in fair weather without using the radio, which can give away a ship's position. EMDEN had a narrow pole foremast, with an observation station at its top. A rangefinder for the forward 15 CM guns is located atop the foremast station. EMDEN's bridge was located on the superstructure immediately forward of the foremast. Her forward funnel was placed immediately aft of the foremast. (BAK)

One of EMDEN's final duties was transporting the remains of Field Marshal and President Paul von Hindenburg and his wife from Königsberg, East Prussia (now Kaliningrad, Russia). This occurred in January of 1945, as Soviet forces closed in on the city. EMDEN lacked functioning engines, so the ship was towed to nearby Pillau (now Baltiysk, Russia), where the bodies were deposited while she underwent emergency repairs. By the beginning of February, EMDEN had one working engine and she took on a full load of refugees and wounded soldiers – but not the Hindenburgs – and sailed for Kiel, Germany. (Via Busch)

Seen in Oslofjord, Norway in the Summer of 1941, EMDEN displays her Black and White hull and superstructure stripes. These stripes were typical of ships assigned duty in the Baltic. White false bow waves were painted fore and aft. The bow and stern are a dark blue-gray similar to the US Navy's Navy Blue. This scheme was an anti-submarine camouflage intended to make it difficult to resolve the ship's speed and course through a periscope. (Via Bob Cressman)





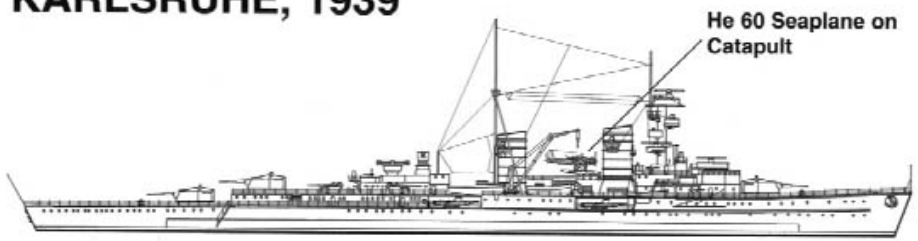
'K' Class

While EMDEN neared completion in 1925, it was obvious to the *Reichsmarine* that the next replacement cruisers would require greatly improved fighting characteristics. The Allied Control Commission (ACC) was already beginning to lose interest, which emboldened German naval architects to submit a new design. This ship contained some of the same characteristics rejected when they were proposed for EMDEN. What they came up with was an entirely new design for a class of ships. These vessels were larger, faster, better armed, and better protected than EMDEN. Simultaneously, they would stay more or less within the 6000-long ton (6720 ton/6096 MT) displacement limit imposed by the Versailles Treaty.

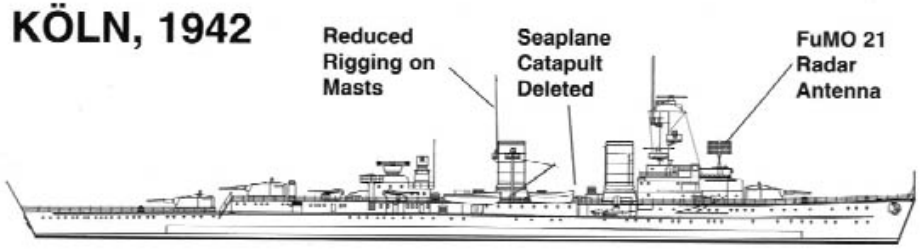
This magic was to be achieved partially by even more extensive use of welding and even greater use of lightweight materials in the place of steel. Welding was used for 85 percent of hull joints in these ships, including the outer shell plating, which had been riveted in EMDEN. This would solve only part of the problem; the rest would be accomplished by a willingness to exceed the treaty limits. Official German records indicate that these ships had a true standard displacement of approximately 6640 long tons (7441 tons; 6750 MT).

Despite exceeding the treaty limits by ten percent, there was no way that all the desired characteristics could be accommodated on this displacement and compromises were made. Most notably, the designers again opted to sacrifice endurance in order to get more of everything else. The best range using the steam turbines at their most economical settings was 7300 NM (8406 miles/13,528 KM) at 17 knots (20 MPH/32 KMH), not significantly better than the smaller EMDEN. In contrast, contemporary Royal Navy cruisers had almost twice the endurance. The German designers adopted a novel solution to address this serious shortcoming. Taking advantage of some open space between the two shafts, they installed a pair of cruising diesels: one for each shaft. Diesels were believed to be lightweight and economical and the basic concept of adding the economy of diesel propulsion to the high-speed available from steam turbines was nothing short of brilliant.

KARLSRUHE, 1939

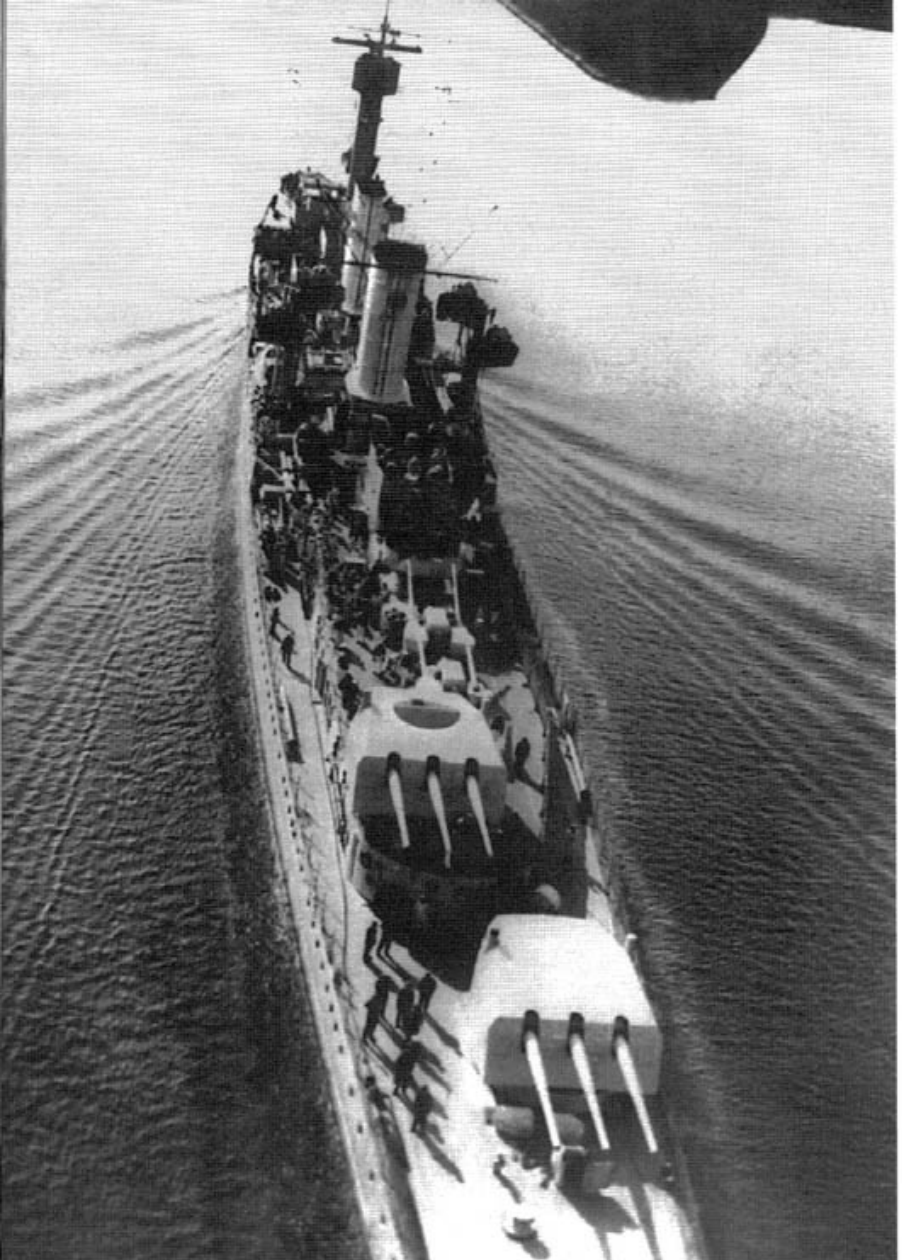


KÖLN, 1942



An early view shows KÖNIGSBERG at Swinemünde. In this view it's easy to see the offset of the after turrets. The funnel and mast just forward of B (*Berta*) turret belong to another vessel moored alongside the cruiser.

This retouched photo shows the light cruiser KARLSRUHE at Swinemünde. The retouching was limited to replacing the *Reichsmarine* ensign with the Nazi flag. This was a common change to earlier photographs after Adolf Hitler came to power in 1933. Otherwise, this view shows the cruiser after her 1931 refit, with a small deckhouse between her funnels.



KÖLN passes beneath one of the bridges over the Kiel Canal as it transits between the Baltic and the North Seas. It was armed with two experimental (and unsuccessful) twin 8.8 CM C/25 *Flak* mounts during the early 1930s. The wide spacing of the barrels can identify this mount. The turret tops appear to be painted Light Gray with a darker colored circle atop 'B' (*Berta*) turret for aircraft recognition. This circle is likely *Deckfarbe Rot 7* (Deck Color Red 7), but could also be Black. (NARA)

Unfortunately, the execution left much to be desired. First, the diesels installed in this class were not designed as naval power plants and they proved to be less robust than desired. Second, the setup was such that either the diesels drove the shafts or the turbines did, but they could not be simultaneously coupled to the shafts. The maximum speed obtainable from the diesels was 10.5 knots (12 MPH/19.5 KMH), with maximum economy at 10 knots (11.5 MPH/18.5 KMH). A larger problem was that the two powerplants used different fuels. The boilers could not use light, low-flash-point diesel fuel and the diesel engines would not employ heavier bunker oil. Cross-piping allowed fuel bunkers to be used for either fuel, and, theoretically, the ships could be loaded with all diesel or all bunker oil. This was never done, although the range would have been 18,000 NM had the ships been loaded with only diesel fuel. The normal mix was to carry 1200 tons of bunker oil and 150 tons of diesel fuel. The biggest problem was the time it took to switch between diesel and steam propulsion. One factor was the time it required to couple or decouple the diesels, a process that took several minutes. More critical was the time it took to bring the turbines on line. Even if steam was up in the boilers, turbines take time to reach full speed. This was enough to discourage the use of the diesels when there was any chance at all of combat.

It was to this design that contracts were let for three cruisers and work began on Cruiser 'B' ('ERSATZ THETIS'), Cruiser 'C' ('ERSATZ MEDUSA') and Cruiser 'D' ('ERSATZ ARCONA') in 1926. At launch, these hulls were christened **KÖNIGSBERG**, **KARLSRUHE**, and **KÖLN**, respectively. KÖNIGSBERG was commissioned into the *Reichsmarine* on 17 April 1929, followed by KARLSRUHE on 6 November 1929 and KÖLN on 15 January 1930.

All three 'K' Class ships had identical dimensions at launch. Each vessel was 169 M (554 feet 5.5 inches) long at the waterline and 174 M (570 feet 10.4 inches) overall, with a beam of 15.2 M (49 feet 10.4 inches) and a draft of 5.4 M (17 feet 8.6 inches) at standard displacement and 6.3 M (20 feet 8 inches) at full load.

In March of 1936, KARLSRUHE was crossing the Pacific Ocean on a training cruise when she encountered a full-fledged typhoon. Her crew watched in horror as several longitudinal frames buckled and a crack developed across the ship at the boat deck level. This crack alternately gaped open by as much as one inch (2.5 CM) and then snapped shut as the ship took seas head on. For several days it was touch-and-go, but the storm eventually abated and the damaged cruiser made for the nearest shelter, Dutch Harbor in the Aleutian Islands, to refuel and inspect the damage. After making what repairs she could with onboard equipment, KARLSRUHE headed for San Diego, California, where additional bracing was added and tears in the shell plating were patched up. Once back in Germany, she went into dock at Kiel for what amounted to a major rebuild. Her shell plating was removed from the bilge keels up to the main deck, her horizontal strength decks were reinforced and extended outward, and new shell plating with a new upper belt of armor was added. This resulted in KARLSRUHE's beam increasing to 16.8 M (55 feet 1.4 inches) and her displacement rising to 8350 tons.

The 'K' Class vessels were originally equipped with six oil-fired Schulz-Thornycroft watertube boilers. These drove geared turbines made by Schichau (KÖNIGSBERG), Germania (KARLSRUHE), and Blohm & Voss (KÖLN). The turbines produced 68,200 SHP and achieved a maximum speed of 32 knots (37 MPH/59 KMH). To this was added a pair of MAN 10-cylinder cruising diesels, which produced 1800 brake horsepower (BHP) and drove the ships at a maximum of 10.5 knots (12 MPH/19.5 KMH).

They had belt armor up to 70MM (2.76 inches) thick and a horizontal armored deck of 20MM (0.79 inch), which was doubled in thickness over the magazines. The armor was a combination of Krupp Cemented (KC) face-hardened and Krupp Non-Cemented (KNC) homogeneous chromium steel. When KARLSRUHE was rebuilt in 1936, she retained this original armor and added an additional 14MM (0.6-inch) upper belt of *Wotan Hart* (Wotan Hard). This was a homogeneous armor plate superior to KNC. She also received a 16MM (0.6-inch) thick upper armored deck of the same material.

The basic complement of the 'K's was 514: 21 officers and 493 other ranks. KÖLN's complement reached as high as 850 towards the end of World War Two.

The main battery consisted of nine 15 CM (5.9-inch) 60 caliber naval rifles in C/25 triple turrets. These were mounted one forward on the centerline and two aft, superfiring. They fired 45.5 KG (100.3-pound) shells at 960 M (3150 feet) per second to a maximum range of 14.05 NM (16.2 miles/26 KM) at a rate of between six and eight rounds per minute. The aft turrets were offset – the forward to port and the after to starboard – to achieve somewhat better arcs of fire. In practice, the guns couldn't be fired at maximum deflection without damaging the aft superstructure and the offsetting of the aft turrets gave no practical advantage.

The secondary battery at launch was just two single 8.8 CM (3.5-inch) 45 caliber C/13 mounts, although numerous lighter guns were added during the 1930s. KÖLN replaced the two single 8.8 CM mounts with a pair of experimental twin mounts (C/25) in the early 1930s. From 1932, both KARLSRUHE and KÖNIGSBERG shipped two additional C/13 mounts abreast the after superstructure. During the mid-1930s, all three cruisers had their existing 8.8 CM mounts replaced by one and later three twin 8.8 CM 76 caliber C/32 mounts, then becoming standard in the fleet. The first of these was on the centerline just forward of 'B' turret and the other two, when fitted, were placed on wing platforms abreast the after superstructure. There are reports that KARLSRUHE replaced her 8.8 CM twin mounts during her 1938-39 refit with an equal number of the 10.5 CM (4.1-inch) 65 caliber C/33 twin mounts as carried on larger ships.

In 1934, KARLSRUHE received four 3.7 CM (1.5-inch) cannon twin-mounts plus eight 2 CM (0.8-inch) cannon in single mounts and the other two ships had similar light *Flak* batteries fitted in the mid-1930s. By late in the war, KÖLN is reported to have carried ten 3.7 CM, eighteen 2 CM, and four 4 CM (1.6-inch) Bofors cannon in various mounts.

All three ships were launched with twelve 50 CM (19.7-inch) diameter torpedo tubes in four triple mounts on the main deck. These were loaded with the same G7 torpedoes as EMDEN. After the larger G7a model became available, the older tubes were replaced with the same number of tubes for the newer torpedo, as EMDEN. Two of KÖLN's quad torpedo mounts were landed in 1940. Space was made available for 120 mines and removable mine laying rails were rigged over the fantail.

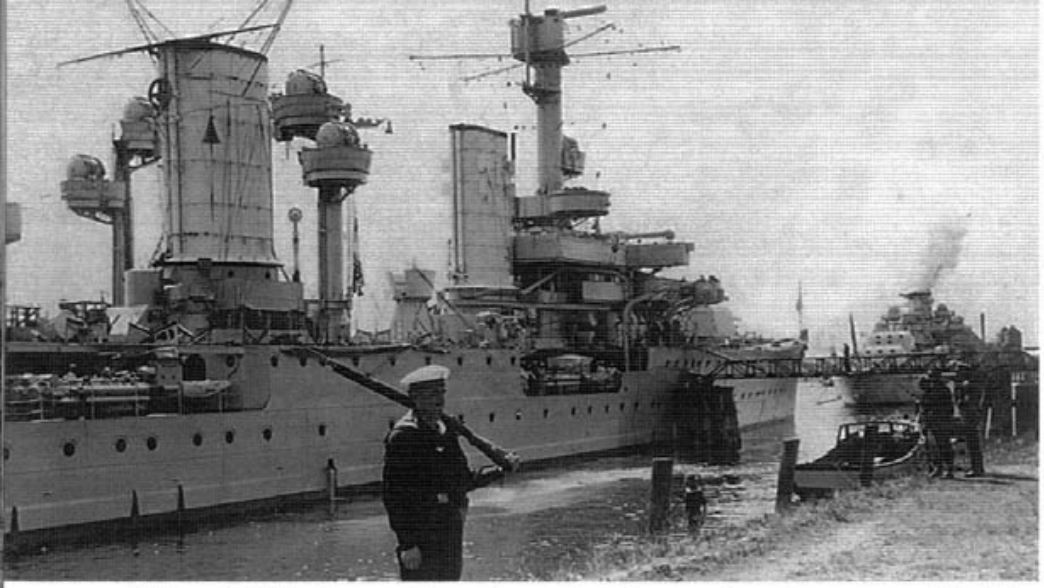
Main battery fire control was provided by three 6 M (19 foot 8.2 inch) optical rangefinders. These were mounted on the fore and aft conning towers and on the foremast. KÖLN had an experimental GEMA 50 CM (19.7-inch) band radar fitted in 1935. The experiments were generally successful, but the radar was unreliable and it was soon removed. KÖNIGSBERG was fitted with one of the first *Seetakt* radars in 1938. This radar operated in the 60 CM (23.6-inch) band. Again, it proved too unreliable and was removed. KÖLN received a FuMO 21 set in the summer of 1941. This radar used a mattress antenna 2 M (6 feet 6.7 inches) high by 4 M (13 feet 1.5 inches) wide, which was mounted in place of the optical rangefinder on the forward conning tower.

Aircraft catapults were fitted between the funnels to all three cruisers in 1935-36, along with the associated crane. The added top weight adversely affected their already suspect stability and the entire fit was removed from KÖLN in 1937. The others retained their catapults until their loss in 1940. A 15 M^2 (161.5-square foot) wooden platform was fitted onto KÖLN's B turret in 1941 to test the suitability of Flettner helicopters for naval use. The tests were successful, but the platform was removed before KÖLN's deployment to Norway in July of 1942.

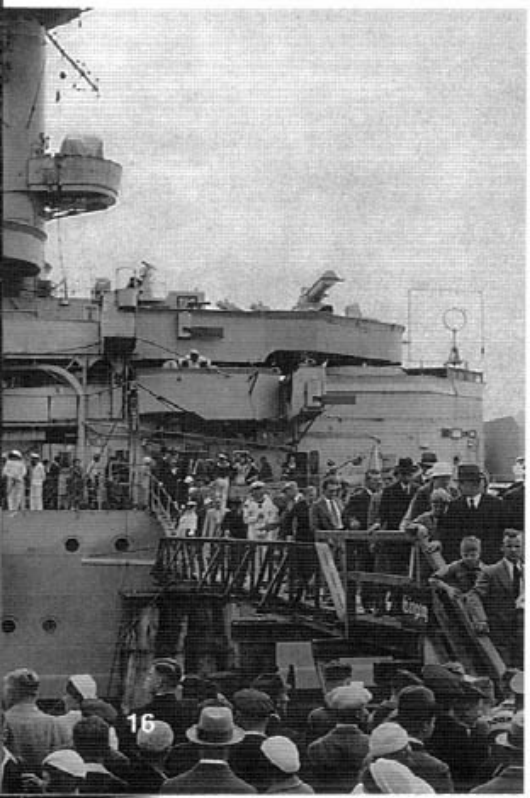
Generally, these cruisers must be regarded as less than successful, largely due to their light construction. KARLSRUHE and KÖNIGSBERG were both lost in the opening months of the war to damage that sturdier ships would likely have survived. KÖLN was deployed to Norway in 1942 and again in 1944, but she was effectively useless because her aging electrical and mechanical systems had become unreliable. Additionally, her light construction made KÖLN unsuitable for operations in the heavy seas off Norway.

Crewmen on KÖNIGSBERG practice with the two single 8.8 CM *Flak* mounts located just forward of her after turrets in 1931. Each 8.8 CM weapon was fitted with an armored shield to protect its crew from shell splinters. (NHC)

KÖNIGSBERG's crew continue their 1931 drills with the two single 8.8 CM *Flak* mounts. The name plaque on the front of B main battery turret beneath the center gun reads 'Lützow.' It was named for Adolf *Freiherr* (Baron) von Lützow, a famous Prussian cavalry general of the Napoleonic Wars. LÜTZOW was also the name of Admiral Franz von Hipper's flagship sunk at Jutland on 31 May 1916. KÖNIGSBERG's other turrets also had name plaques. (NHC)



Before World War Two, any time not spent training was often given over to public diplomacy. This meant port calls at friendly and neutral harbors, where it was normal to open the ship to the public at certain times. These were popular events, which often attracted large crowds. These views show just such an open ship day on KÖNIGSBERG in 1935, probably at Swinemünde. Another light cruiser, probably LEIPZIG, is seen moored ahead of KÖNIGSBERG. (NHC)



(Left) A crowd of visitors walk off KÖNIGSBERG during this 1935 open day. Additional onlookers gathered near the gangplank. There is a curious square frame around the Direction Finder (DF) loop mounted atop the bridge. The purpose of this frame is unknown. (NHC)

(Right) KÖNIGSBERG is tied along the dock at Gdynia, Poland during a port call in 1935. This was a clear case of 'gunboat diplomacy'. Gdynia and nearby Gdansk were known as Gotenhafen and Danzig, respectively, when they were part of East Prussia before 1919. The Versailles Treaty ceded these areas to Poland. The region's population was still predominately German and the Nazis were already applying pressure for the return of the 'Polish Corridor' to Germany. KÖNIGSBERG's port call no doubt was deliberately planned to increase that pressure. (NHC)

'K' Class Cruisers Battle Histories

KÖNIGSBERG:

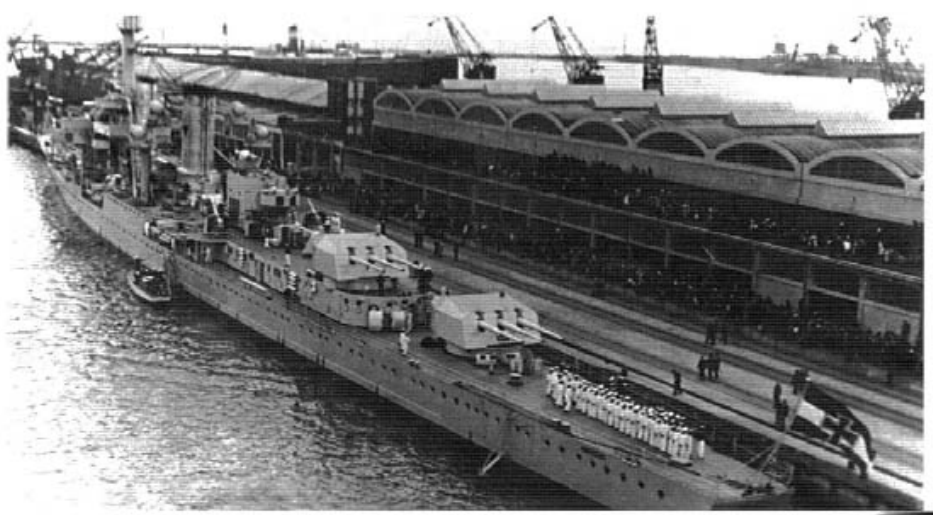
3-30 September 1939: Operation WESTWALL extending minefields into North Sea.
12-13 November 1939: With light cruiser NÜRNBERG, supported mining of Thames Estuary.
7 April 1940: Assigned to Group 3 (Bergen) of Operation WESERÜBUNG (WESER EXERCISE; invasion of Norway) with KÖLN. Assembled at Wilhelmshaven.
9 April 1940: Damaged by shore batteries on approach to Bergen; three hits; flooded boiler room and lost power. Docked at Bergen for temporary repairs.
10 April 1940: Three hits and three near-misses by 100-pound (45.4 KG) bombs from Royal Navy (RN) Blackburn Skuas of 800 and 803 Squadrons. Capsized and sank.
1942-45: Wreck floated and scrapped.

KARLSRUHE:

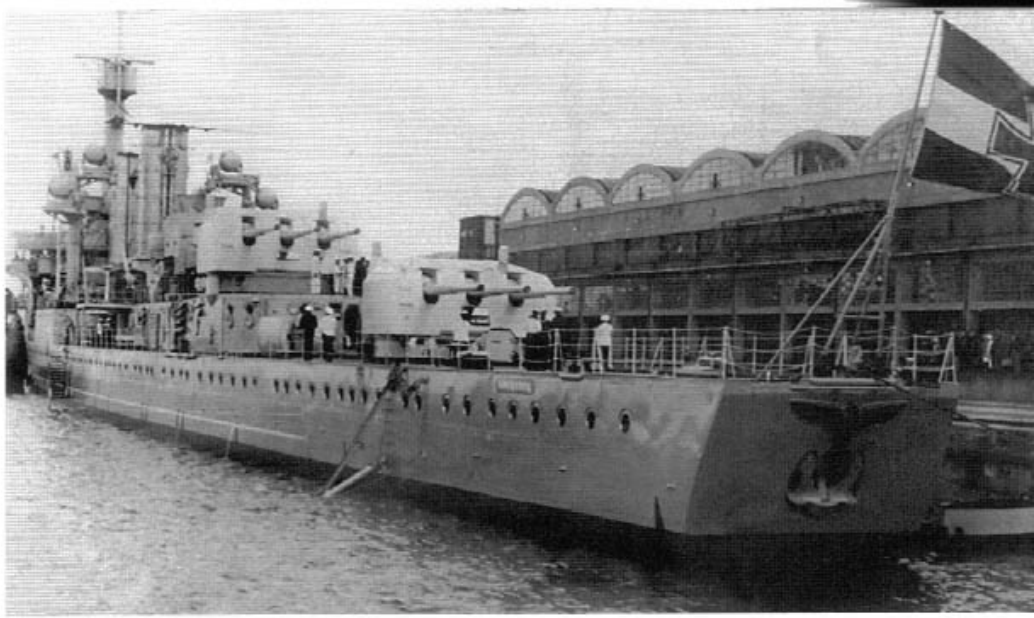
13 November 1939: Recommissioned after refit.
7 April 1940: Assigned to Group 4 (Kristiansand) of Operation WESERÜBUNG (invasion of Norway). Assembled at Bremerhaven.
9 April 1940: Lands troops and departs Kristiansand. Torpedoed by submarine HMS TRUANT. One torpedo causes loss of all power. Scuttled by two torpedoes from German torpedo boat GREIF.

KÖLN

3-30 September 1939: As KÖNIGSBERG.
7-9 October 1939: Escorts battleship GNEISENAU on sortie to south coast of Norway. Attacked unsuccessfully by Royal Air Force (RAF).
21-27 November 1939: With light cruiser LEIPZIG, escorted battleships SCHARNHORST and GNEISENAU into North Sea, then detached to raid shipping in Skagerrak.
12-13 December 1939: Sortie with light cruisers NÜRNBERG and LEIPZIG to support mining off Newcastle. Attacks by British submarine HMS SALMON damaged other two light cruisers.
7 April 1940: As KÖNIGSBERG.
9 April 1940: Returns undamaged from Bergen.
23-29 September 1941: Operations in Baltic to block escape of Soviet warships.



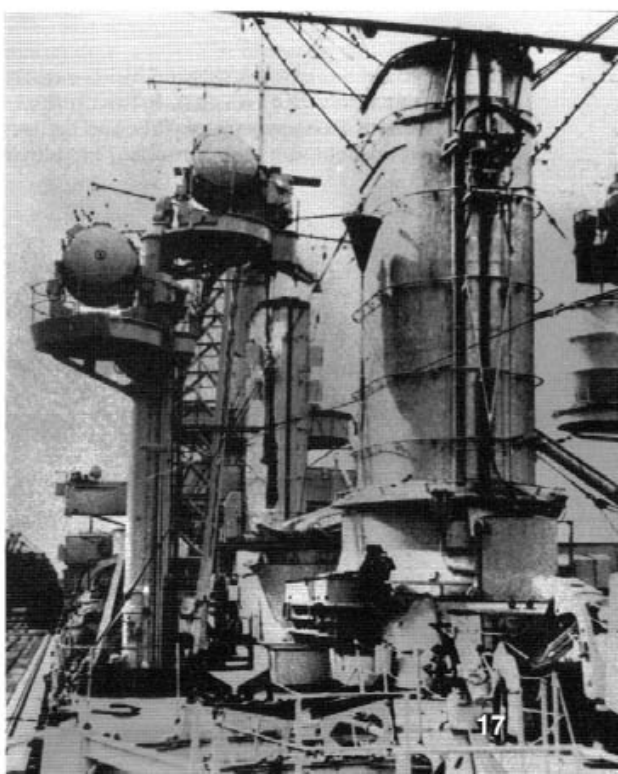
October 1941: Operations off Dägo (Hiiumaa) and Ösel (Saaremaa) islands in support of German invasion.
12-13 October 1941: Operation WESTFALLEN (WESTPHALIA), bombardment of shore positions on Cape Ristna, Dägo Island.
13 October 1941: Attacked unsuccessfully by Soviet submarine SHCH-323.
5 February-23 May 1942: Refit at Wilhelmshaven.
13 July 1942: Assigned to Norway.
6 August 1942: Arrives at Narvik to relieve armored ship LÜTZOW.
10 September 1942: Moves to Altafjord with armored ship ADMIRAL SCHEER and heavy cruiser ADMIRAL HIPPER to attack convoy PQ18. Operation cancelled.
February 1943: Decision to withdraw from service. Sails to Baltic with ADMIRAL HIPPER.
March 43-January 1944: Out of service at Kiel.
January 1944: Decision to reactivate. Towed to Königsberg (Kaliningrad).
1 April 1944: Recommissioned at Königsberg.
1 July 1944: Assigned to training duty.
11 October 1944: Loaded 90 mines at Swinemünde to be laid in Skagerrak.
15-20 October 1944: RAF attacks cause mining operations to be aborted.
November 1944: Docked at Oslo.
13 December 1944: Near-misses during attack at Oslo by RAF No. 5 Group cause loss of all power.
31 December 1944: More near-misses.
4 January 45: Transfer to Wilhelmshaven. Damaged by air attack near Wangerooge.
30 March 1945: Sunk upright during United States Army Air Forces (USAAF) air raid at Wilhelmshaven.
5 April 1945: Decommissioned.
April 1945: 'B' & 'C' turrets, supplied with power from shore, bombard advancing British troops for two nights.

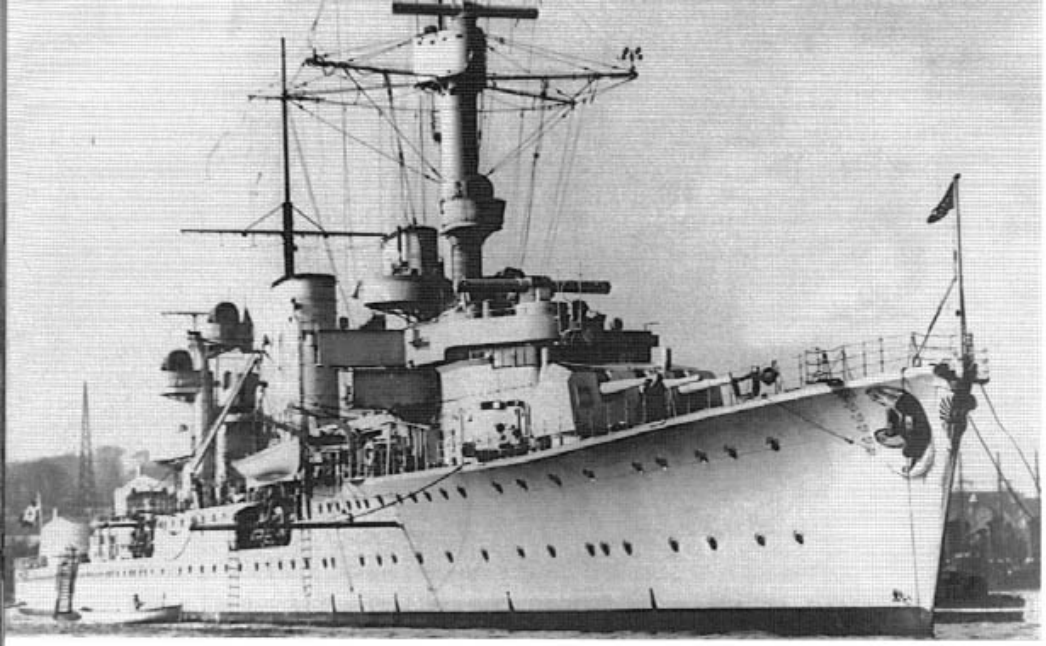


The *Reichsmarine* ensign flies from KÖNIGSBERG's stern during her 1935 visit to Gdynia. The Nazi eagle was added to KÖNIGSBERG's transom stern in 1934. The lower portion of this eagle, which grasps a wreathed swastika, appears just above the stern anchor. The ship's name is displayed in raised lettering on a rectangular plate just above the portholes on her port quarter. The name also appeared on the ship's starboard side. (NHC)

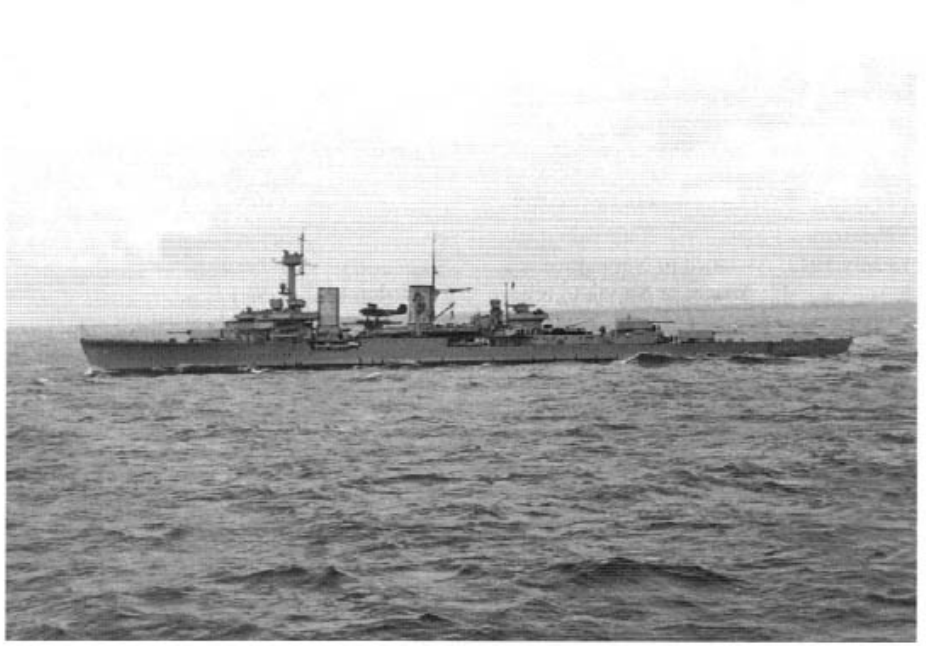
(Left) The *Reichsmarine* flag is displayed on KÖNIGSBERG's jackstaff while docked at Gdynia in 1935. This flag was replaced by the Nazi's swastika flag later in 1935, when the *Kriegsmarine* ensign was adopted. The turret tops are painted *Deckfarbe für Aussen Dunkelgrau 51* (Deck Color for Outside Dark Gray 51) with a White aircraft recognition circle on A (*Anton*) turret. (It's interesting to note that photographs taken in Europe at this time most often were shot with orthochromatic film, which rendered red the same as black, while those shot in America mostly used panchromatic, which rendered red the same as other colors.) (NHC)

(Right) KÖNIGSBERG is seen sometime between mid-1935 and mid-1936. She was equipped with an aircraft catapult between her funnels in early 1935. The 'pylon' style antenna spreaders on her after funnel were removed in late 1936. Elaborate searchlight platforms are alongside, but not attached to, the after funnel. A large aircraft-handling crane is located behind the portside searchlight structure. (NHC)





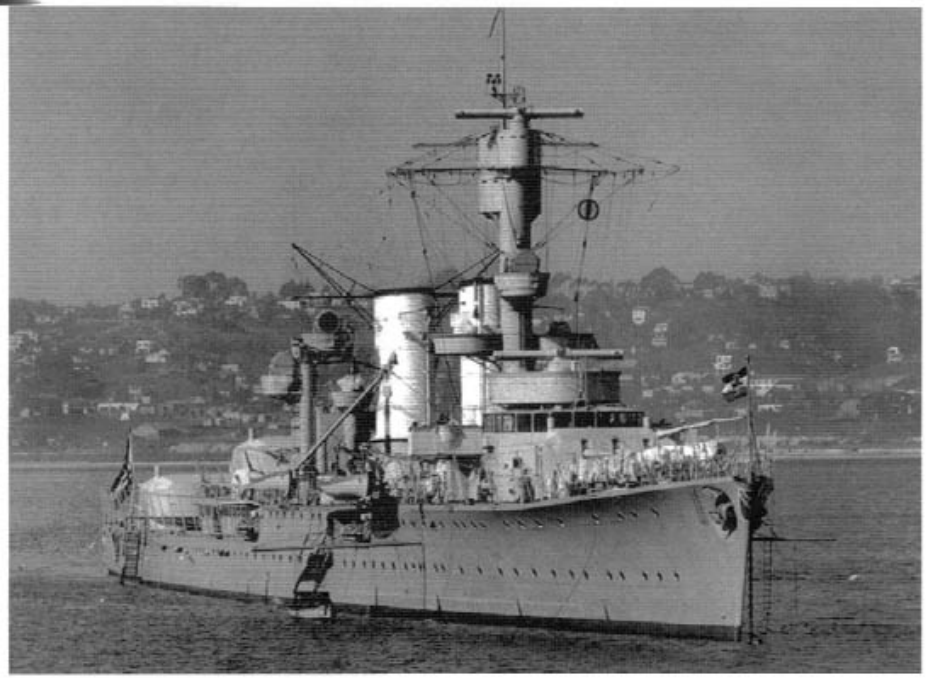
KÖNIGSBERG shows the simple mast with crosstrees. The latter replaced the antenna spreaders at the rear of the after funnel in her 1936 refit. A White circle is painted on her dark (probably Dark Gray) turret top. She has retained the square frame around the DF loop on her bridge. (NHC)



KÖNIGSBERG exercises in the Baltic Sea in 1939. A Heinkel He 60 is positioned on her catapult. This was one of the few times one of these cruisers was actually photographed with her aircraft in place. In 1938, KÖNIGSBERG was chosen for an experimental radar installation that involved a fixed, forward-facing antenna on a temporary deckhouse just in front of the foremast. In this view, the antenna appears to have been removed, but the deckhouse is still in place. (Via Schilters)

In mid-November of 1939, KÖNIGSBERG exercised with LEIPZIG and another unidentified cruiser (probably NÜRNBERG). KÖNIGSBERG began a final refit immediately after the conclusion of those exercises. This was her last refit before her loss on 10 April 1940.

Patriotic graffiti was painted on KÖNIGSBERG's A turret when viewed on 7 April 1940. The image shows a German sailor sticking an umbrella in the eye of a dapper gentleman, representing Anthony Eden. Eden was an outspoken anti-Fascist in the prewar years and had resigned the post of Foreign Secretary under then-Prime Minister Neville Chamberlain in 1938 in protest over Chamberlain's appeasement of German *Führer* (Leader) Adolf Hitler. Eden was reappointed to that post under Prime Minister Winston Churchill in May of 1940. (*'Verzeihung'* translates as 'Sorry' and is obviously meant sarcastically.) Ironically, KÖNIGSBERG was sunk three days later, while Eden went on to become Great Britain's Prime Minister in 1955.

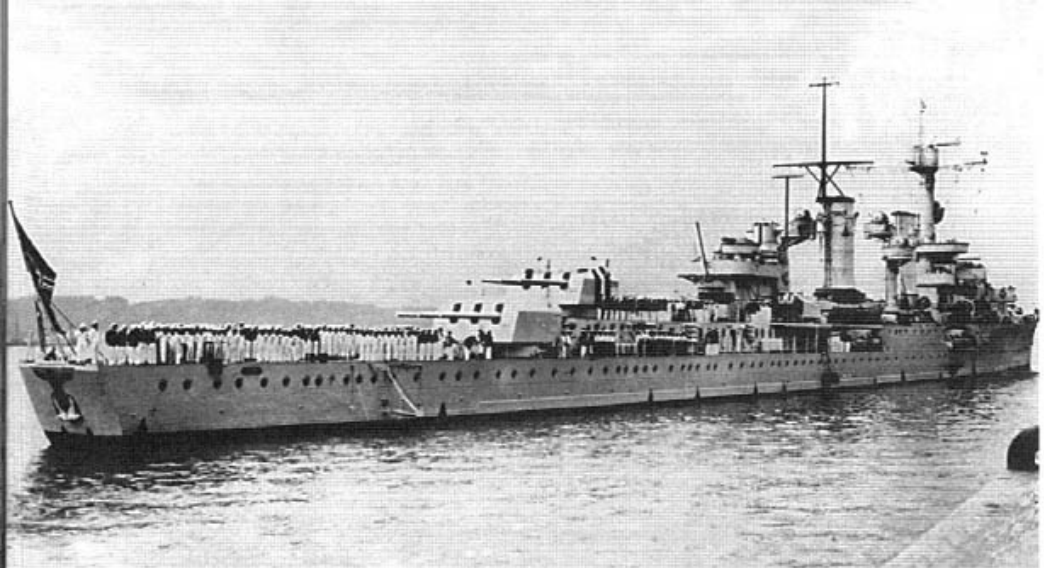


KARLSRUHE is docked at San Diego, California on 28 March 1934. The pre-war paint scheme of a Dark Gray hull and the Light Gray superstructure is similar to the wartime scheme, except for the *Emulsion 95* finish on the funnels. *Emulsion 95* was a heat-resistant paint with the same pigment as Light Gray, but its much higher reflectance often made it look lighter. (NHC)

This is another view of KARLSRUHE at San Diego. Three of the four single 8.8 cm *Flak* mounts are seen on the aft deckhouse. Unlike either of her sisters, KARLSRUHE had a two-level fighting top on her foremast. (Via Bob Cressman)

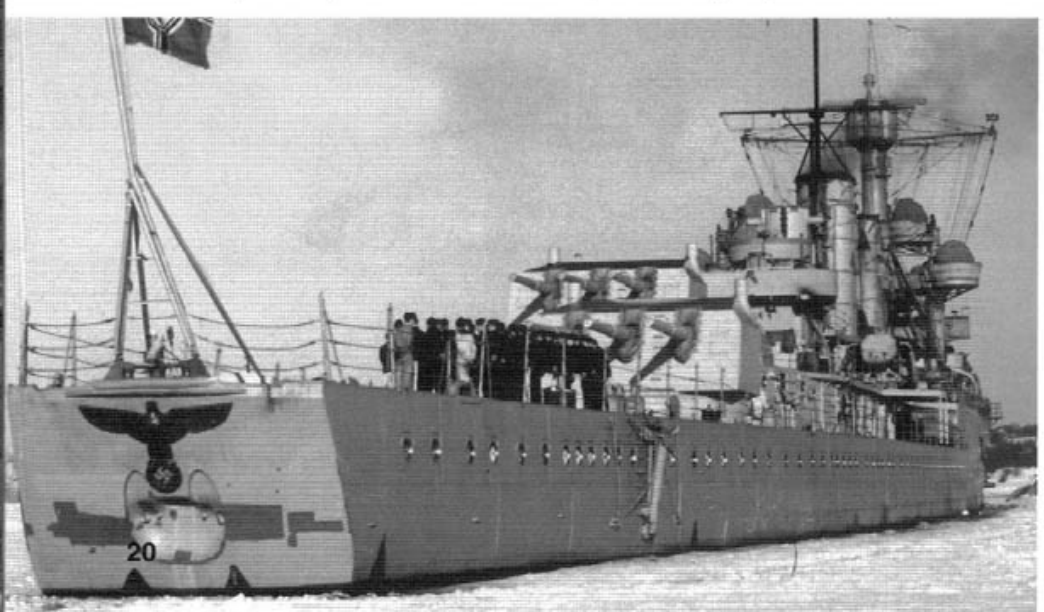
KARLSRUHE and the naval tanker MITTELMEER are seen at St. Thomas, US Virgin Islands on 7 May 1936. This is after KARLSRUHE's near disaster in the Pacific Ocean and the emergency repairs at San Diego. She's on her way home for a major reconstruction. Germany was so short of foreign currency reserves at the time that ships on extended training missions with stops at foreign ports were often met by supply ships from Germany. (NHC)

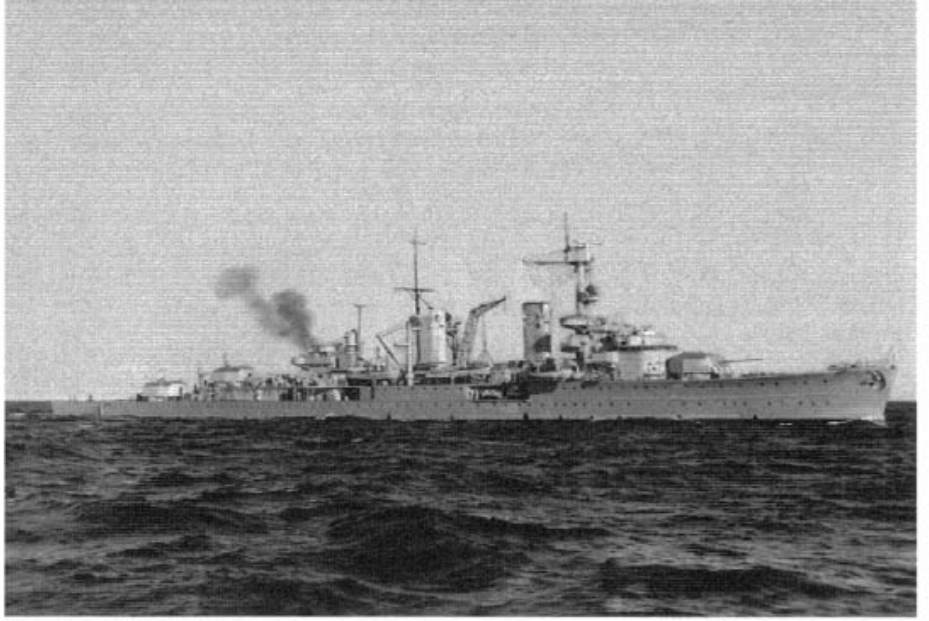
This rare view of KARLSRUHE was taken after she emerged from her 1939 refit and before her loss in April of 1940. She received several new features in that refit, which included replacing the foremast's two-level fighting top with a single-level structure. Her after funnel was shortened and the light mainmast attached to it replaced by a heavier tripod. Prominent caps were fitted to both funnels. The large searchlight structure alongside the after funnel was removed and smaller searchlight platforms were mounted on both funnels.



KÖLN participates in the Neutrality Patrol along the Biscay coast during the Spanish Civil War. Her B turret displays the (from front) Black, White, and Red recognition stripes. These stripes date from 1937, when the International Non-Intervention Commission divided the Spanish coast into sectors. These were patrolled by the four powers: Britain, France, Italy, and Germany. This was one of the most cynical exercises in history, as Germany and Italy actively intervened on the Nationalist side, while preventing supplies from reaching the Republicans in Asturias and Catalonia. (Via Ken Macpherson)

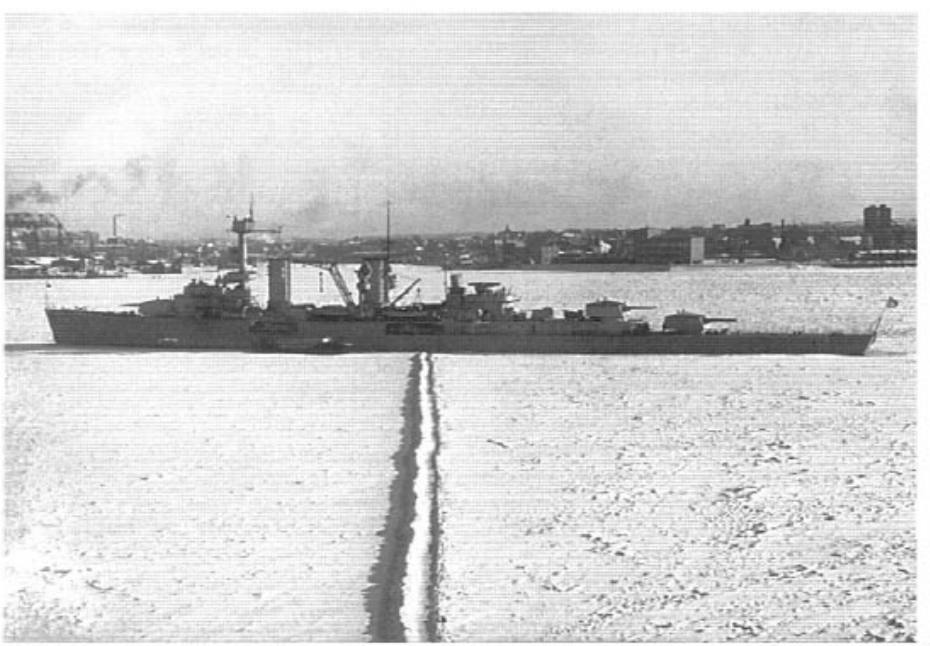
The winter of 1939-40 was one of the coldest on record and northern Germany's normally open-water ports were ice-bound for more than a month. KÖLN was trapped in enforced idleness in Kieler Förde. Although normal training was on hold, ship maintenance continued as usual. This is indicated by the patches of anti-rust paint on the stern, which was soon overpainted by the normal Medium Gray hull color. (BAK)





KÖLN is seen on 7 October 1939, just over one month after World War Two began. This was right after an aborted patrol with the battleship GNEISENAU. KÖLN's catapult was removed and the lower of the two amidships searchlights were deleted on both sides in an attempt to improve her stability. Her turret tops are painted a dark color, possibly Red, but more likely still the peacetime Dark Gray. Otherwise, she's in the standard two-tone gray wartime paint scheme. The plaques at her bow were painted out.

KÖLN was trapped in ice-bound Kieler Förde during the winter of 1939-40. The ice reached a thickness that resupply was accomplished by running sleds across the ice. A path for these sleds was cut between the dock and the ship. The turret tops appear to be painted Dark Gray. (BAK)

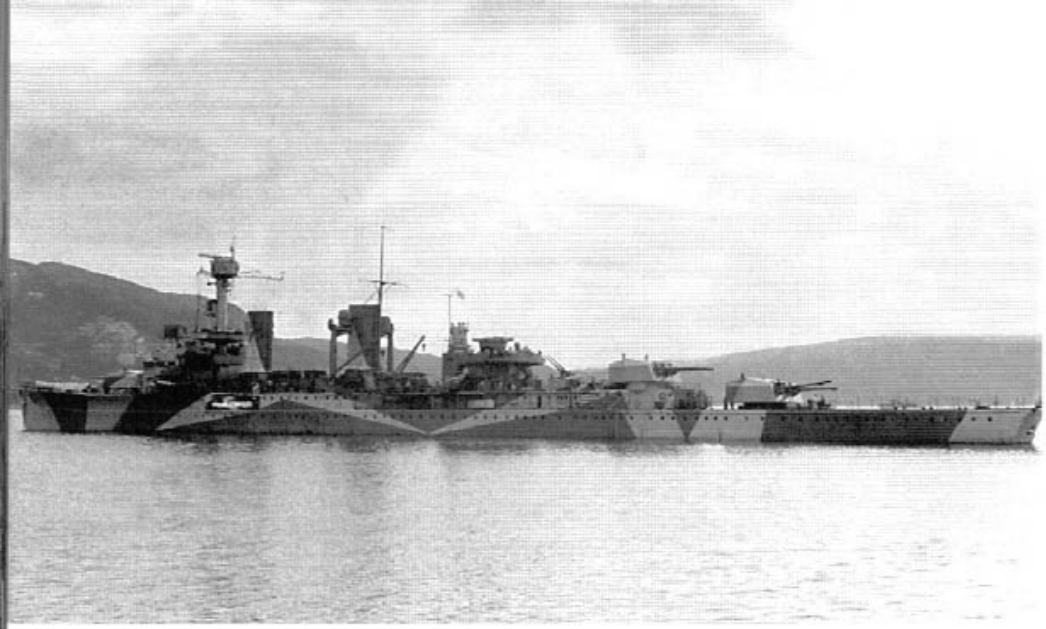


Freed of the ice, KÖLN transferred to Wilhelmshaven, Germany in the early spring of 1940. It was there that she loaded troops for Operation WESERÜBUNG, the German invasion of Norway. Orders called for turret tops to be painted *Deckfarbe Gelb 13* (Deck Color Yellow 13) as an aircraft recognition marking for this operation and it appears in this view taken on her return on 11 April 1940. Her turret tops are much lighter than in the previous views taken a month or two earlier. KÖLN flies the flag of *Befehlshaber der Aufklärungsstreitkräfte* (BdA; Commander, Scouting Forces) from her foretop. This is a White pennant with a Black 'Iron Cross' and two Black circles in the quadrants nearer the staff.

(Below) KÖLN, seen over KÖNIGSBERG's A turret, on the same day. As above, the aft turrets are swung out on opposite bearings, in readiness for expected action. There is an open ventilation grating with sliding cover on the aft slope of the turret roof. (Via Dufaux)

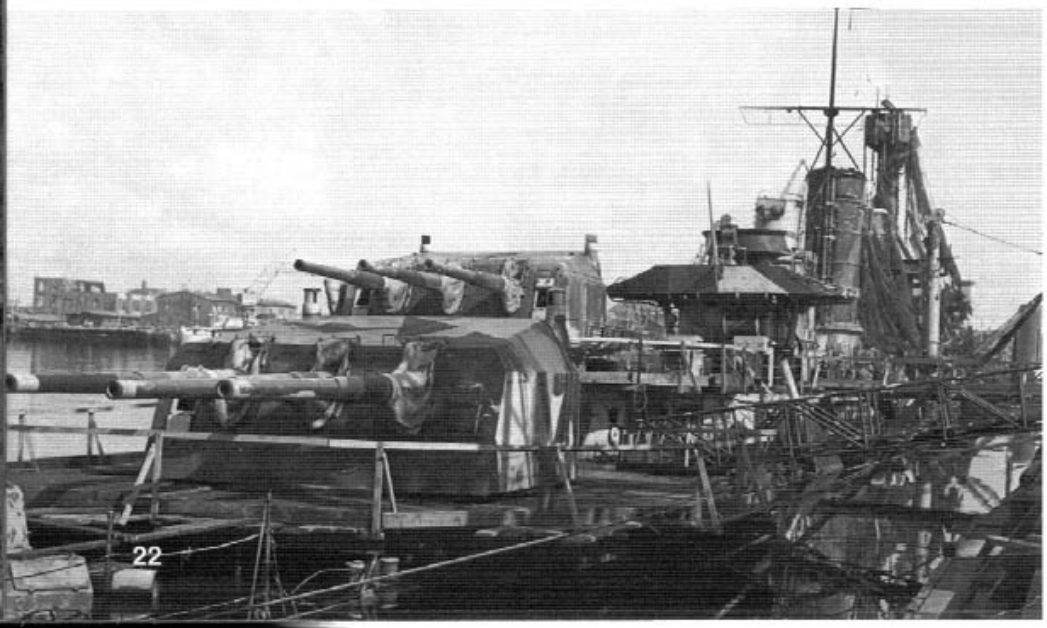
Enroute to Bergen for Operation WESERÜBUNG, an officer reads out orders to his troops, a naval gunnery detachment, embarked on either KÖLN or KÖNIGSBERG, 7 April 1940. He stands in the open deck area just forward of B turret, under the twin barrels of an 8.8 cm *Flak* mount. (ECPA)

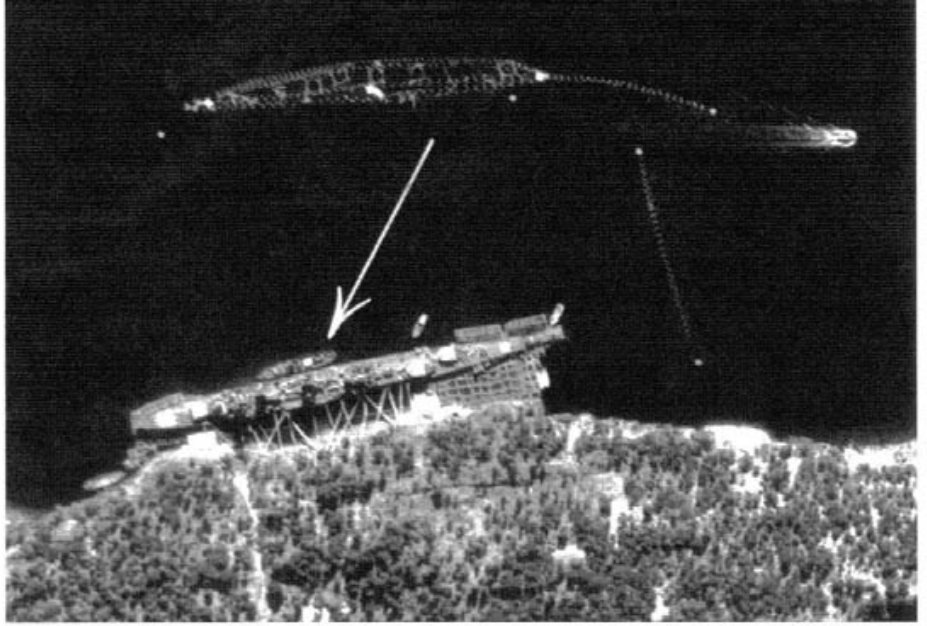
An *Obermaat* (Chief Petty Officer) supervises four sailors swabbing KÖLN's quarterdeck. C (*Cäsar*) main turret is just ahead of these sailors, while B (*Berta*) turret is forward of and to port of C turret. Tompions fitted to the gun muzzles protected the barrels when the weapons were not in use. Bucklers fitted around the guns' barrels kept sea and rainwater out of the turret interior. Metal rungs on the turret face served as a ladder for crews to access the turret roof. (BAK)



KÖLN, the only surviving 'K' Class ship, is camouflaged while in Norwegian waters. She came to Norway to replace the armored ship LÜTZOW in July of 1942 and left after little accomplishment in January of 1943. Changes since 1940 include removal of the after torpedo tube sets, addition of a degaussing cable along her hull, and replacement of her forward main battery rangefinder by a FuMO 21 antenna. KÖLN is camouflaged with Dark Blue-Gray splinters over the standard Medium Gray and Light Gray scheme.

KÖLN ended World War Two settled on the bottom alongside a pier at Wilhelmshaven. Even in this condition, she remained capable of shore bombardment. Wooden platforms built around her B (*Berta*) and C (*Cäsar*) turrets allowed the guns to be supplied from shore. KÖLN fired her last shots in anger at advancing British troops in mid-April of 1945. (PAC)





This British Royal Air Force (RAF) reconnaissance photo shows KÖLN at Faettenfjord, near Trondheim, Norway, on 19 July 1942. She has swastika air recognition symbols painted fore and aft, with the forward emblem on a cross deck Red band. (NHC)

German Warship Colors of World War Two

Schiffstarnfarbe (Ship's Camouflage Color) *31, Hellgrau* (Light Gray) – Superstructure

Schiffstarnfarbe 31$_2$ Dunkelgrau (Dark Gray) – Hull (This was a Medium Gray that was hard to distinguish from the Light Gray upperworks in certain lighting conditions)

Schiffsbodenfarbe (Ship's Hull Color) *I 22a Rot* (Red) – Underwater Hull Color

Wasserlinienfarbe (Waterline Color) *I 23a Grau* (Gray) – Waterline Color (This Dark Gray was indistinguishable from Black in most photographs. This was supposed to be applied 1 M/3.3 feet above and below the standard displacement waterline.)

Deckfarbe (Deck Color) *50 Hellgrau* – Deck Color (This was also used on funnel caps.)

Deckfarbe 51 Dunkelgrau – Deck Color (NOTE: This was also used on funnel caps.)

Wasserfarbe (Water-Based Color) *95 Hellgrau* – Pre-war funnel color (Also called *Emulsion 95*; this color was almost White in appearance.)

Aluminiumbronze (Aluminum Bronze) *76* – Funnel Cap color (This semi-reflective Aluminum-colored paint was similar in appearance to the metallic paint often used on fabric-covered aircraft.)

General Note: German ships also carried quantities of Black, White, Red, Yellow, Blue, Green, and Brown tinting colors. These were used as needed to create air recognition panels and one-off camouflage schemes, such as the Green-Brown schemes reported in the Baltic and the Blue-Gray schemes seen in Norwegian waters. The various other Gray colors seen in the Baltic and Norwegian camouflage schemes were not official colors, but were mixed as needed using the two standard Grays mixed with one or more tints.

LEIPZIG and NÜRNBERG

LEIPZIG and NÜRNBERG were improved repeats of the 'K' Class cruisers. They were similar to each other, but not identical. Both light cruisers shared an updated powerplant, a beamier hull form, and a single funnel arrangement. Other visible differences from the 'K' Class included the placement of the after turrets on the centerline, rather than offset to port and starboard, and the reversion to a curved fantail rather than the transom stern of the 'K' Class.

The most significant of the differences from the 'K' Class was a revised powerplant arrangement. This involved the addition of a third screw and shaft to which the diesels were directly coupled. Theoretically, this solved the problem of using the diesels in conjunction with the steam turbines. The diesels could turn the central shaft while the turbines turned the outer shafts. While this arrangement worked well, to change from this to either of the other two possible arrangements (turbines-only or diesels-only), or between those other arrangements, required that all three shafts be idle for the ten or more minutes it took to change the coupling. It was during just such a changeover that LEIPZIG drifted into the path of the heavy cruiser PRINZ EUGEN and was rammed in October 1944.

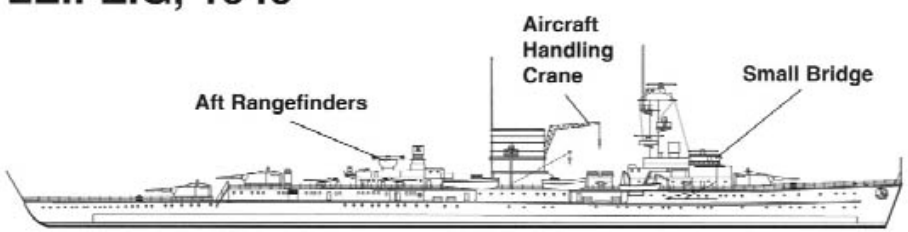
This dual propulsion system did have advantages, which were demonstrated when LEIPZIG was torpedoed on 13 December 1939. The British torpedo hit at the bulkhead between the forward and middle boiler rooms. Flooding in these compartments led to the immediate loss of power to the port turbine and damage to the steam pipes meant the gradual loss of power to the other turbine over the next 15 minutes. Only the diesels remained operable and were able to drive the ship at up to 15 knots (17.3 MPH/27.8 KMH). Fear for the integrity of the remaining bulkheads led to her speed being reduced to 10 knots (11.5 MPH/18.5 KMH) for most of the return to Brunsbüttel, Germany.

The two cruisers in this group were largely similar, but several changes were made to the design of NÜRNBERG in the five years after LEIPZIG was laid down. Most of those changes were superficial, but the most important was that NÜRNBERG was physically larger in all dimensions and displaced approximately ten percent more than her sister. The more obvious visible differences included a larger forward superstructure and the adoption of a searchlight platform around the funnel.

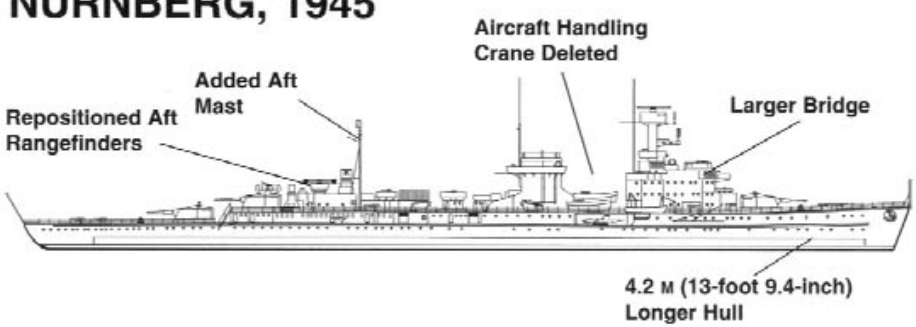
Unfortunately, many of the problems with the 'K' class were not resolved in the new designs. They were just as lightly constructed and poorly protected. Despite the broader hull form, they suffered from the same short range and poor handling in bad weather. Combat experience

LEIPZIG's single funnel immediately distinguished her from the earlier 'K' Class cruisers. She enters Swinemünde, Germany sometime before her 1934 refit, when a catapult was added forward of her funnel. The lattice structure seen rising above LEIPZIG's forward rangefinder is actually a tower on shore.

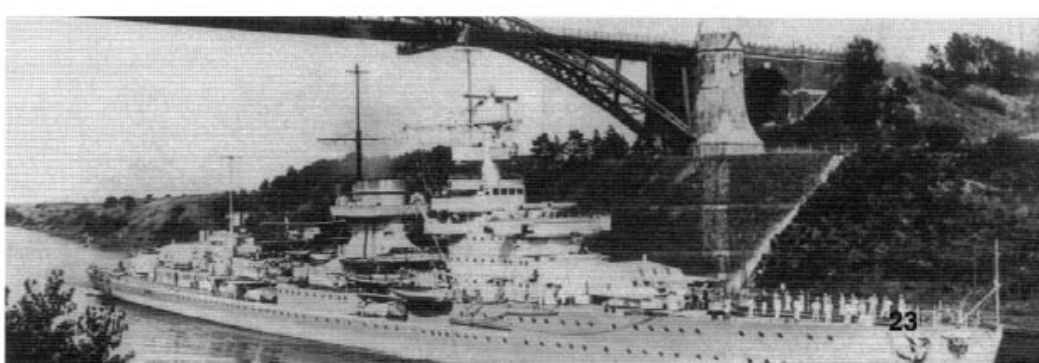
LEIPZIG, 1940



NÜRNBERG, 1945

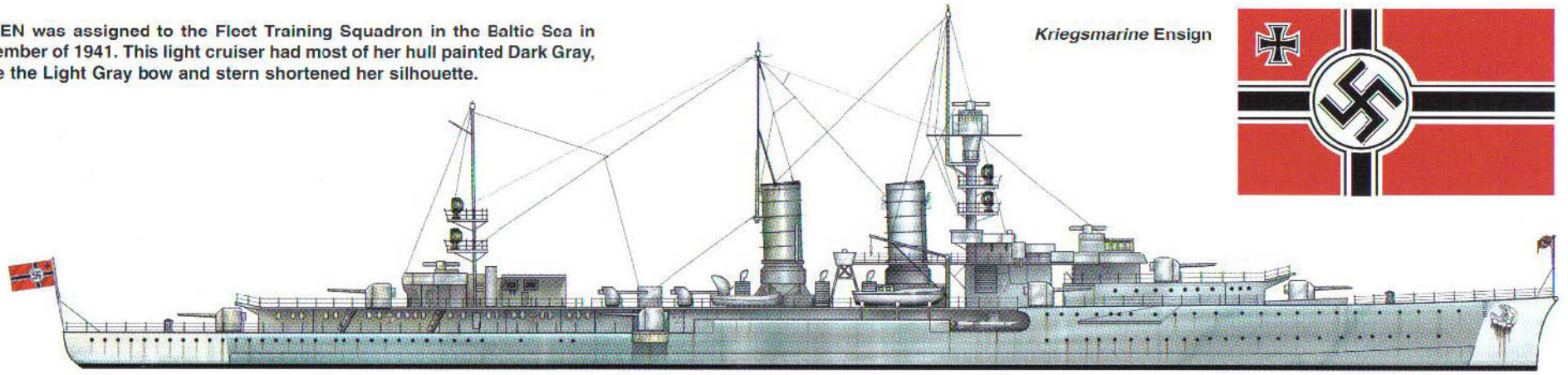


NÜRNBERG passes under a bridge along the Kiel Canal in 1938. Her forward superstructure was larger than that of any of the earlier cruisers, which made her easy to distinguish. Two vertical exhaust pipes for her diesel cruising engines are visible between her aft superstructure and B turret. The 'K' Class had similar pipes that could be stowed when not in use, but those on the LEIPZIGs were fixed and often got in the way. (Via Bob Cressman)

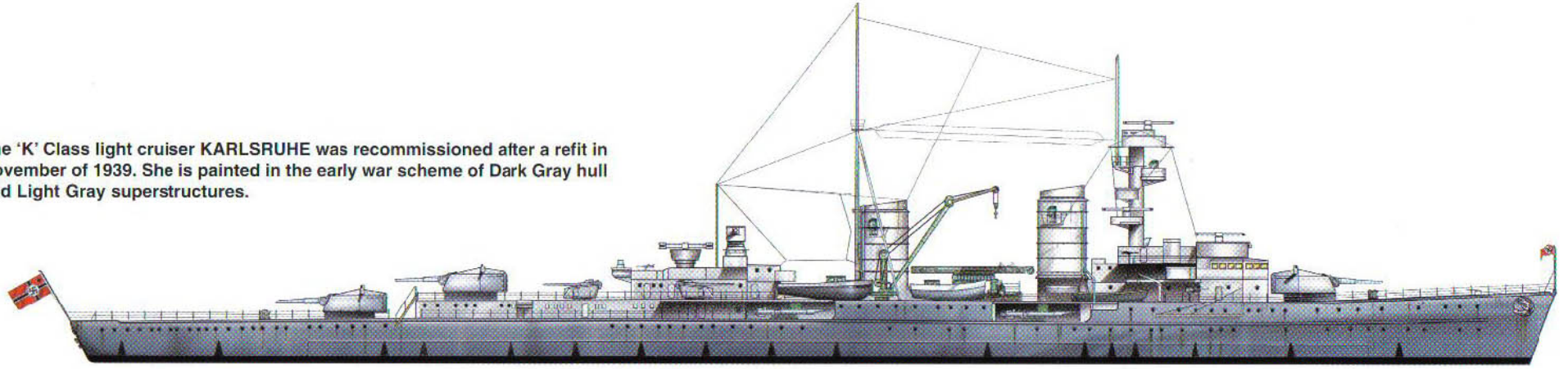


EMDEN was assigned to the Fleet Training Squadron in the Baltic Sea in November of 1941. This light cruiser had most of her hull painted Dark Gray, while the Light Gray bow and stern shortened her silhouette.

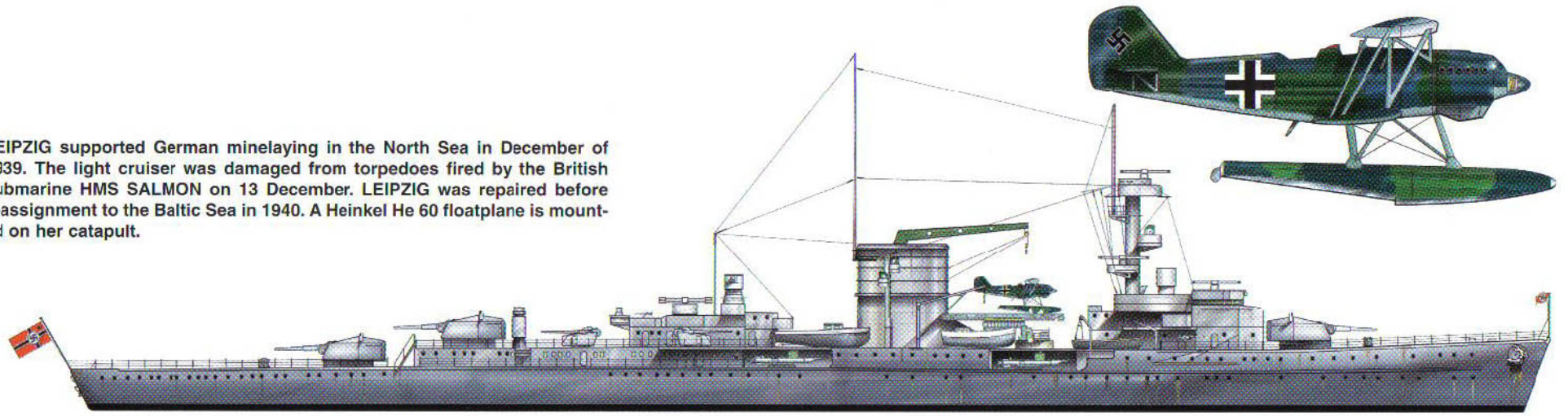
Kriegsmarine Ensign



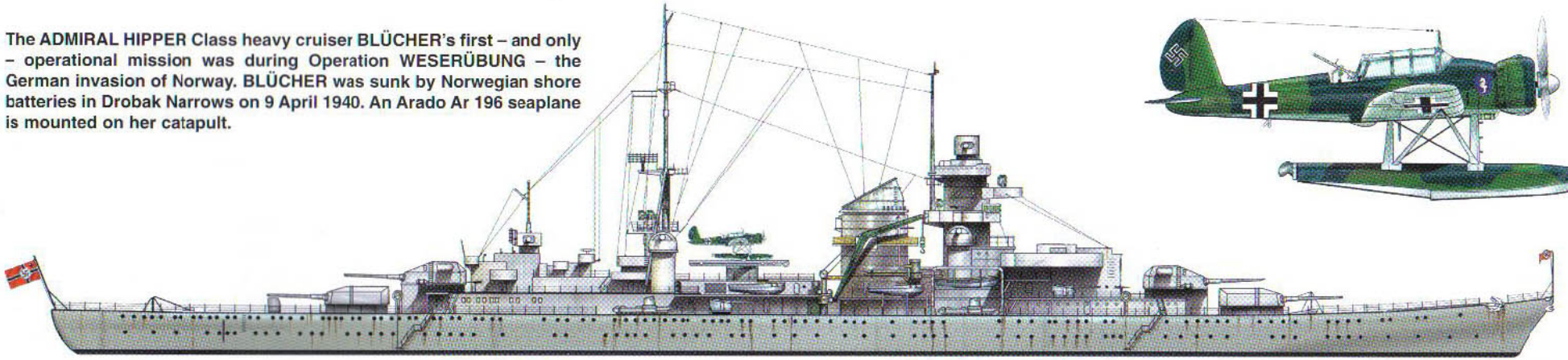
The 'K' Class light cruiser KARLSRUHE was recommissioned after a refit in November of 1939. She is painted in the early war scheme of Dark Gray hull and Light Gray superstructures.



LEIPZIG supported German minelaying in the North Sea in December of 1939. The light cruiser was damaged from torpedoes fired by the British submarine HMS SALMON on 13 December. LEIPZIG was repaired before reassignment to the Baltic Sea in 1940. A Heinkel He 60 floatplane is mounted on her catapult.

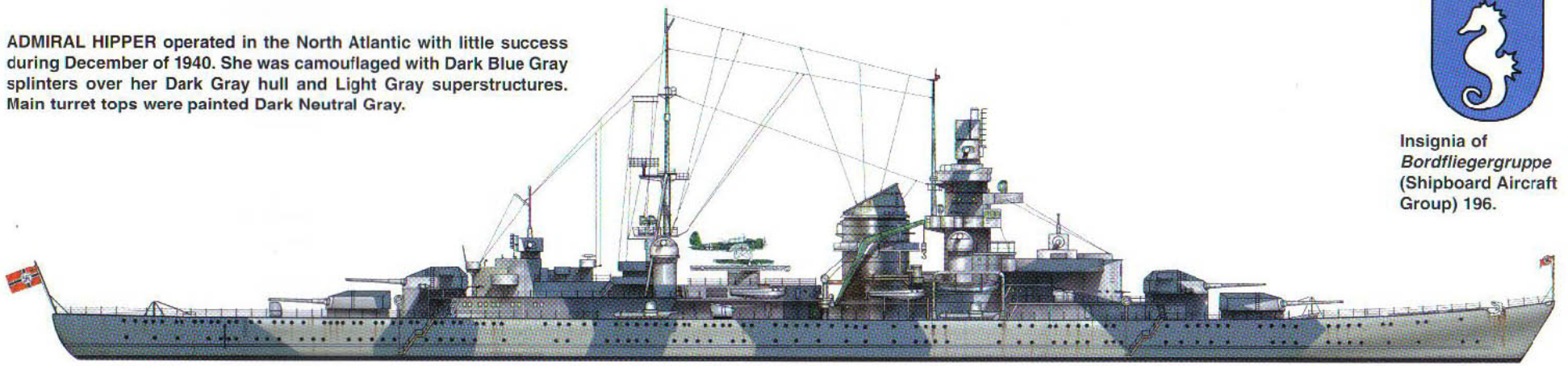


The ADMIRAL HIPPER Class heavy cruiser BLÜCHER's first – and only – operational mission was during Operation WESERÜBUNG – the German invasion of Norway. BLÜCHER was sunk by Norwegian shore batteries in Drobak Narrows on 9 April 1940. An Arado Ar 196 seaplane is mounted on her catapult.

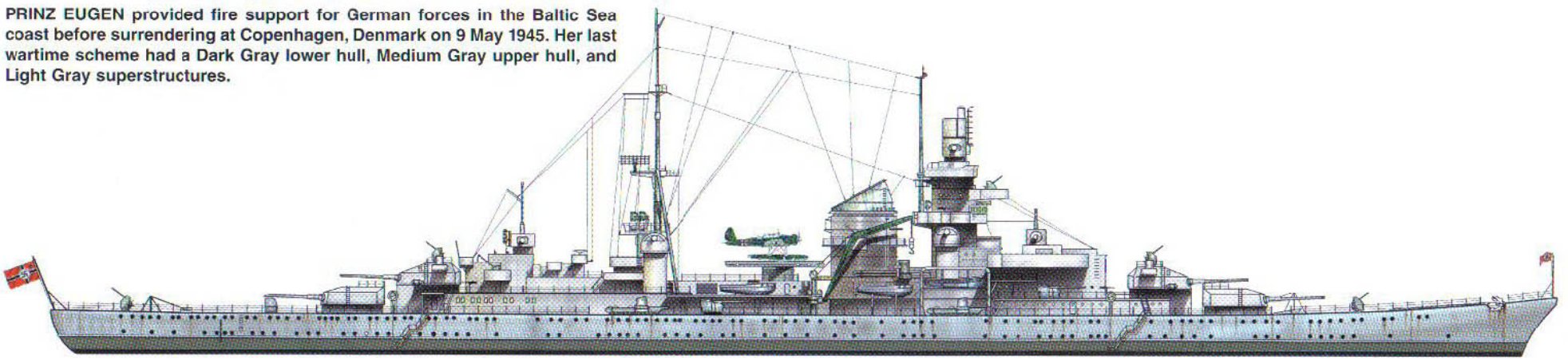


ADMIRAL HIPPER operated in the North Atlantic with little success during December of 1940. She was camouflaged with Dark Blue Gray splinters over her Dark Gray hull and Light Gray superstructures. Main turret tops were painted Dark Neutral Gray.

Insignia of *Bordfliegergruppe* (Shipboard Aircraft Group) 196.



PRINZ EUGEN provided fire support for German forces in the Baltic Sea coast before surrendering at Copenhagen, Denmark on 9 May 1945. Her last wartime scheme had a Dark Gray lower hull, Medium Gray upper hull, and Light Gray superstructures.



structure. These four mounts were replaced in the late 1930s by three twin 76 caliber C/32 mounts, positioned as they were in the 'K' Class ships. From 1941, she mounted eight 3.7 CM (1.5-inch) 83 caliber guns in four twin C/30 mounts and fourteen 2 CM (0.8-inch) 65 caliber cannon in single C/30 and C/38 mounts. By war's end, the total battery of medium and light *Flak* was twelve 3.7 CM and twenty-two 2 CM, some of the latter in quadruple mounts. NÜRNBERG had four twin 8.8 CM mounts and four twin 3.7 CM mounts installed from launch. Additional 2 CM were fitted as World War Two progressed.

These ships were launched with twelve 53.3 CM (21-inch) diameter torpedo tubes in triple mounts on the main deck. These were loaded with the same G7a torpedoes as in EMDEN. Both ships landed their aft tubes after they were torpedoed in 1939. LEIPZIG's forward tubes were later removed, probably in 1941.

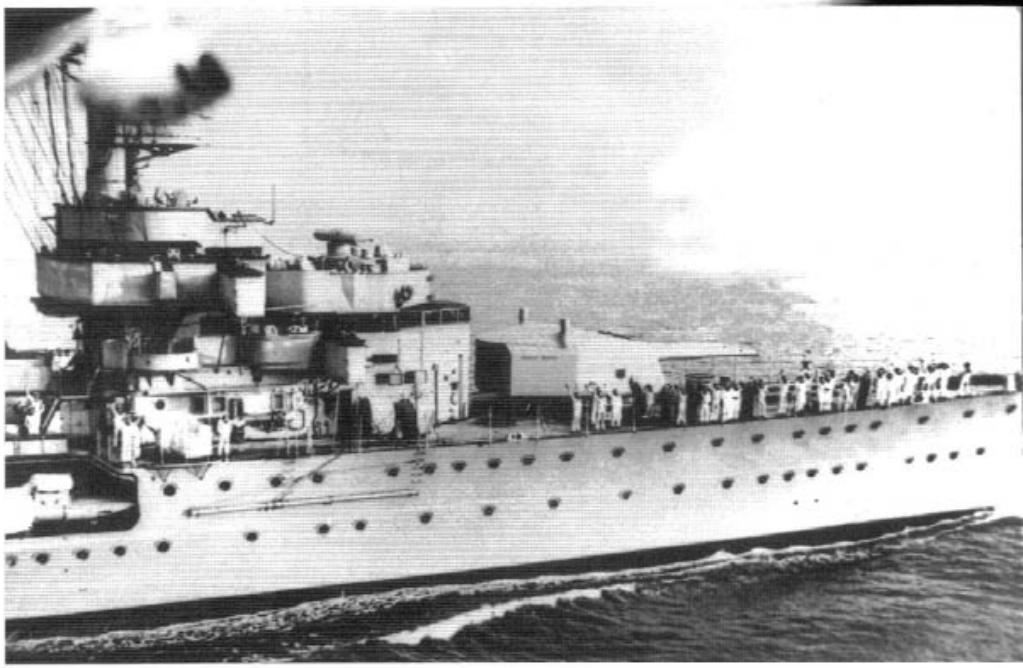
Main battery fire control was provided by three 6 M (19 feet 8.2 inch) optical rangefinders. These were mounted on the fore and aft conning towers and on the foremast. NÜRNBERG, like KÖLN, had her forward rangefinder replaced by a FuMO 21 radar set in late 1941. This radar used a mattress antenna 2 M (6 feet 6.7 inches) high by 4 M (13 feet 1.5 inches) wide. The radar remained until sometime in 1943, when it was replaced by an improved FuMO 22 set. The antenna was moved to the front face of the foremast on an enlarged platform that had previously held a searchlight. The position on top of the forward conning tower where that antenna had been was taken by a 3.7 CM *Flak* mount. At the same time, five fixed FuMB[2] *Ant* 4 *Sumatra* antennas were fitted to the outer face of her foretop, one in front and two on each side. These antennas were most often used with the FuMB 1 *Metox* radar detector. Sometime later, the forward-facing *Sumatra* antenna was removed and replaced with a rotating FuMB *Ant* 6 *Palau* antenna on a small platform built out from the forward face of the foretop above the radar antenna. Towards the end of the war, in late 1944 or early 1945, a *Hohentweil-K* FuMO 63 aircraft detection radar was installed and its associated 2 M high by 2.4 M (7 feet 10.5 inches) wide antenna was positioned atop the mainmast, which was stiffened by aft-slanting tripod struts.

When LEIPZIG was recommissioned in August of 1943, she was given a FuMO 25 with a 2 M by 4 M antenna mounted in front of the foremast as on NÜRNBERG. Sometime later, but before her collision with PRINZ EUGEN in October 1944, LEIPZIG was fitted with a *Palau* antenna as NÜRNBERG as well as one fixed *Sumatra* antenna on each side of her foretop.

An aircraft catapult was fitted aft of the funnel on LEIPZIG in December of 1934, along with the associated aircraft-handling equipment. This equipment was removed in 1941. NÜRNBERG was the only one of the light cruisers completed with catapult and aircraft-handling equipment. This equipment was removed in early 1942.

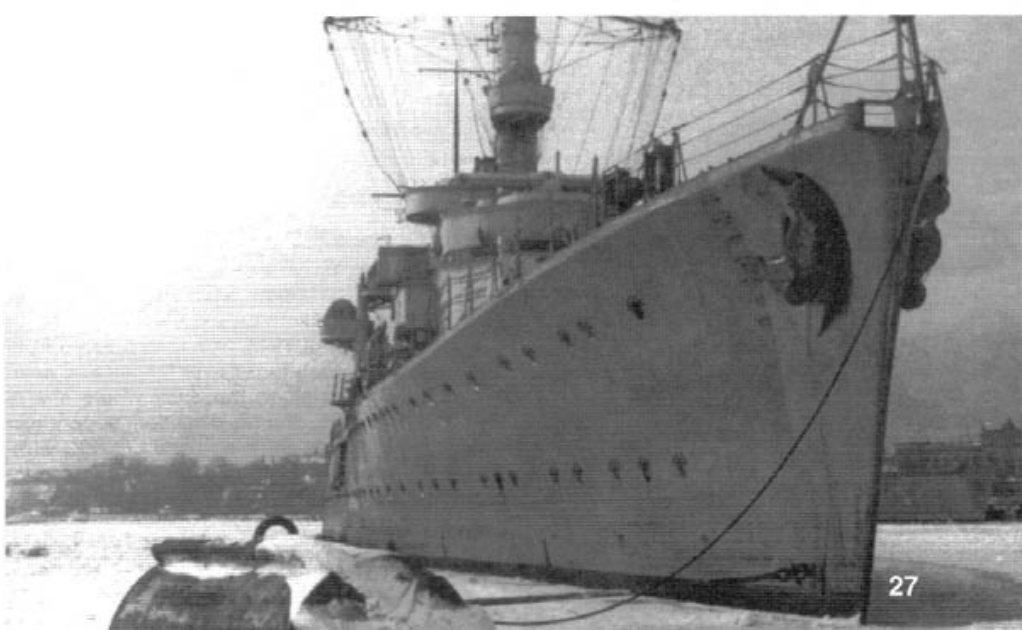
It is perhaps understandable that LEIPZIG was built, given that she was laid down before the 'K' class cruisers entered service, but it is much harder to understand the decision to build NÜRNBERG. By the time she was authorized, the 'K' Class' general unsuitability for the tasks generally given to light cruisers had to be apparent. The only explanation was that NÜRNBERG was built for lack of anything better to do. The *Kriegsmarine* was under pressure from the Nazi state's political leadership to build up the Navy as rapidly as possible. The Versailles Treaty allowed the construction of one more light cruiser and no better design was available at the time. The *Kriegsmarine* was unwilling to wait the year or more required to prepare a better design and built NÜRNBERG with all its known flaws. She and the five earlier light cruisers were too lightly built to operate effectively in the heavy weather of the northern seas and too short-ranged to escape to calmer waters. Above all, they were too weakly protected to absorb anything other than trivial damage and remain in a fight.

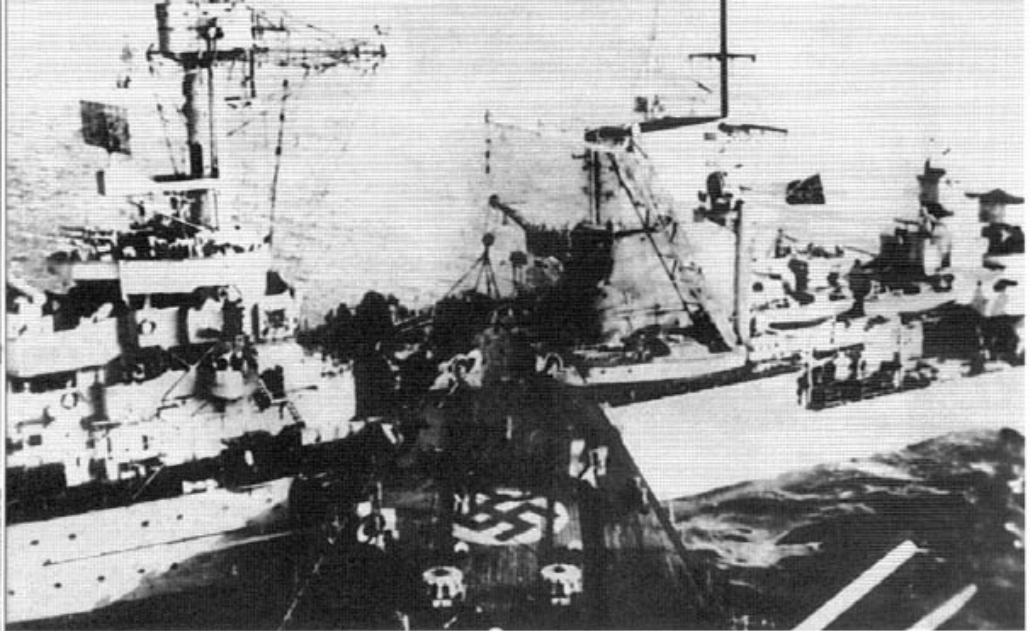
[2]FuMB: *Funkmess-Beobachtung*; Radio-Direction Finder, Passive Detection.

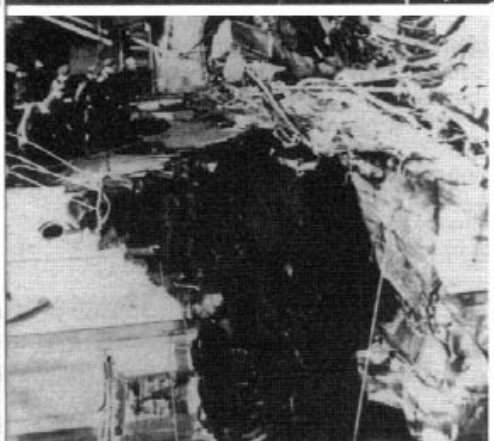


Seen from a low-flying aircraft, LEIPZIG's forward superstructure is essentially indistinguishable from those of the earlier 'K' Class. Only details of the platform arrangement around the foremast allow a definite identification to be made.

LEIPZIG is held firm by Baltic Sea ice while in port during one particularly cold winter. One anchor is mounted on each bow side. A line runs from the bow to a buoy off her starboard bow. Portholes along the sides were covered on the inside to prevent interior light from leaving the ship during wartime operations at night or in foul weather. (BAK)







(Above) The heavy cruiser PRINZ EUGEN rammed LEIPZIG off Gotenhafen after dark on 15 October 1944. The collision occurred as LEIPZIG was drifting across the swept channel while she tried to engage her turbine drive. The two ships remained wedged together for 18 hours until PRINZ EUGEN broke free. A FuMO 25 antenna is mounted on the foremast platform, while the rotating *Palau* antenna is on an arm extending above the radar mattress antenna. The fixed *Sumatra* dipole antenna is located on the foretop's side. (NHC)

(Left) Damage to LEIPZIG became apparent after PRINZ EUGEN broke free 18 hours after the collision. The gash in LEIPZIG's side wasn't serious, but she was essentially a hulk until put back in something like seaworthy condition in February of 1945. (NHC)

LEIPZIG was used as a floating battery for a month at various points around Gotenhafen harbor after her powerplant was put back in service in March of 1945. She fires a salvo from C (*Cäsar*) turret over fences and powerlines along the quay where she is docked. Her ammunition supply ran out at month's end and LEIPZIG withdrew to the West, where she surrendered at the war's end in May of 1945. (NHC)

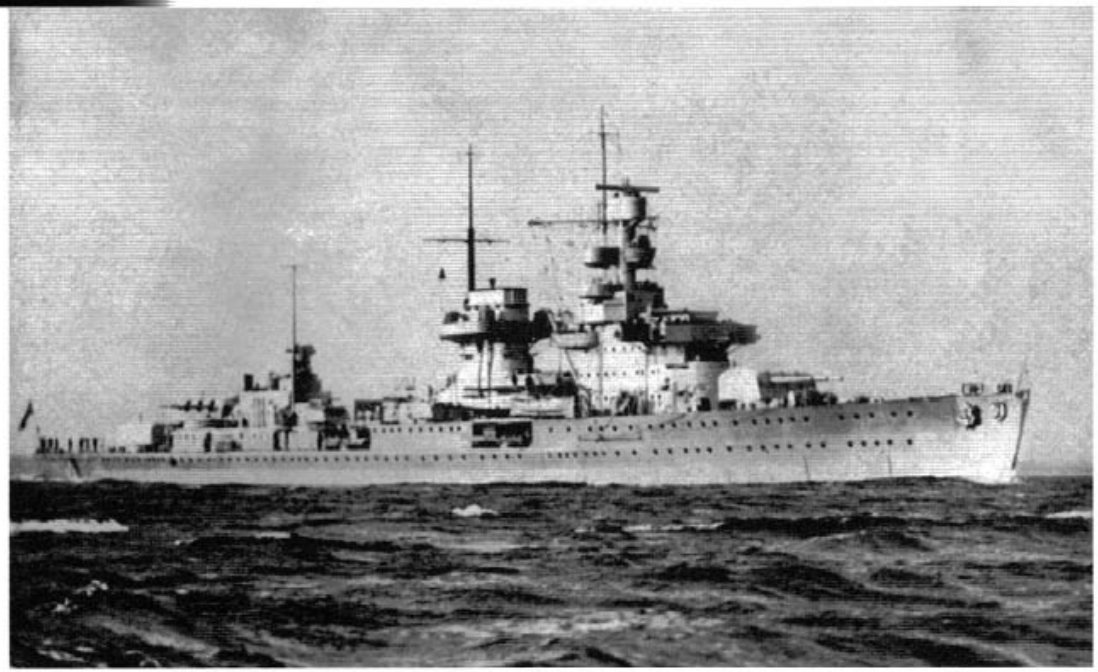
LEIPZIG and NÜRNBERG Battle Histories:

LEIPZIG:

3-30 September 1939: Operation WESTWALL extending minefields into North Sea.
7 November 1939: Collision with German training ship BREMSE; minor damage.
18-19 November 1939: Supported minelaying off Humber Estuary, England.
21-25 November 1939: With light cruiser KÖLN, escort sortie by battleships SCHARNHORST and GNEISENAU into North Atlantic. At latitude of Skagerrak, detached for anti-shipping operation, with KÖLN and armored ship LÜTZOW.
12-13 December 1939: With light cruisers NÜRNBERG and KÖLN. Supported minelaying off Newcastle. Torpedoed by British submarine HMS SALMON.
December 1939-November 1940: Repairs and conversion to training ship.
16-17 September 1941: With light cruiser EMDEN, shelling Sworbe Peninsula on Ösel (Saaremaa) Island off Estonia. Russian submarine SHCH-317 attacks without success.
September 1943: Returned to active service to support troops in Baltic.
15 October 1944: Rammed by heavy cruiser PRINZ EUGEN off Hela (now Hel, Poland); towed to Gotenhafen (Gdynia) for temporary repairs; tied up there.
2 February 1945: Ordered to be made seaworthy.
9 March 1945: Fires guns at advancing Russian forces in defense of Gotenhafen.
24 March 1945: Runs out of 15 CM rounds; sails for the west with full load of wounded and refugees.
29 March 1945: Docked at Apenrad (Åbenrå), Denmark.
30 June 1945: Moved to Wilhelmshaven under Royal Navy (RN) escort.
20 December 1945: Decommissioned.
9 July 1946: Scuttled in Skagerrak.

NÜRNBERG:

3-30 September 1939: As LEIPZIG.
12-13 November 1939: With light cruiser KÖNIGSBERG, supported minelaying in Thames Estuary, England.
12-13 December 1939: As LEIPZIG. Damaged in bow by torpedo from British submarine HMS SALMON.
December 1939-May 1940: Repairs.
25-27 July 1940: Escorted GNEISENAU from Trondheim to Kiel.
August 1940-November 1942: In the Baltic.
November 1942: Assigned to Norway Battle Group.
2 December 1942: Arrived Narvik.
May 1943: To Baltic.
13 January 1945: Laid Titus minefield in Skagerrak.
27 January 1945: Docked at Copenhagen; attacked by Danish partisans.
9 May 1945: Surrenders to Royal Navy at Copenhagen.
24-26 May 1945: With PRINZ EUGEN, sailed for Wilhelmshaven under Royal Navy escort.
5 November 1945: Handed over to Soviets; renamed ADMIRAL MAKAROV.
2 January 1946: Sailed for Libau (Liepaja); joins Soviet Baltic Fleet.
21 February 1957: Reassigned to training duties at Kronstadt.
20 February 1959: Decommissioned and removed from Navy List.
March 1959-February 1961: Scrapped at Leningrad (now St. Petersburg).



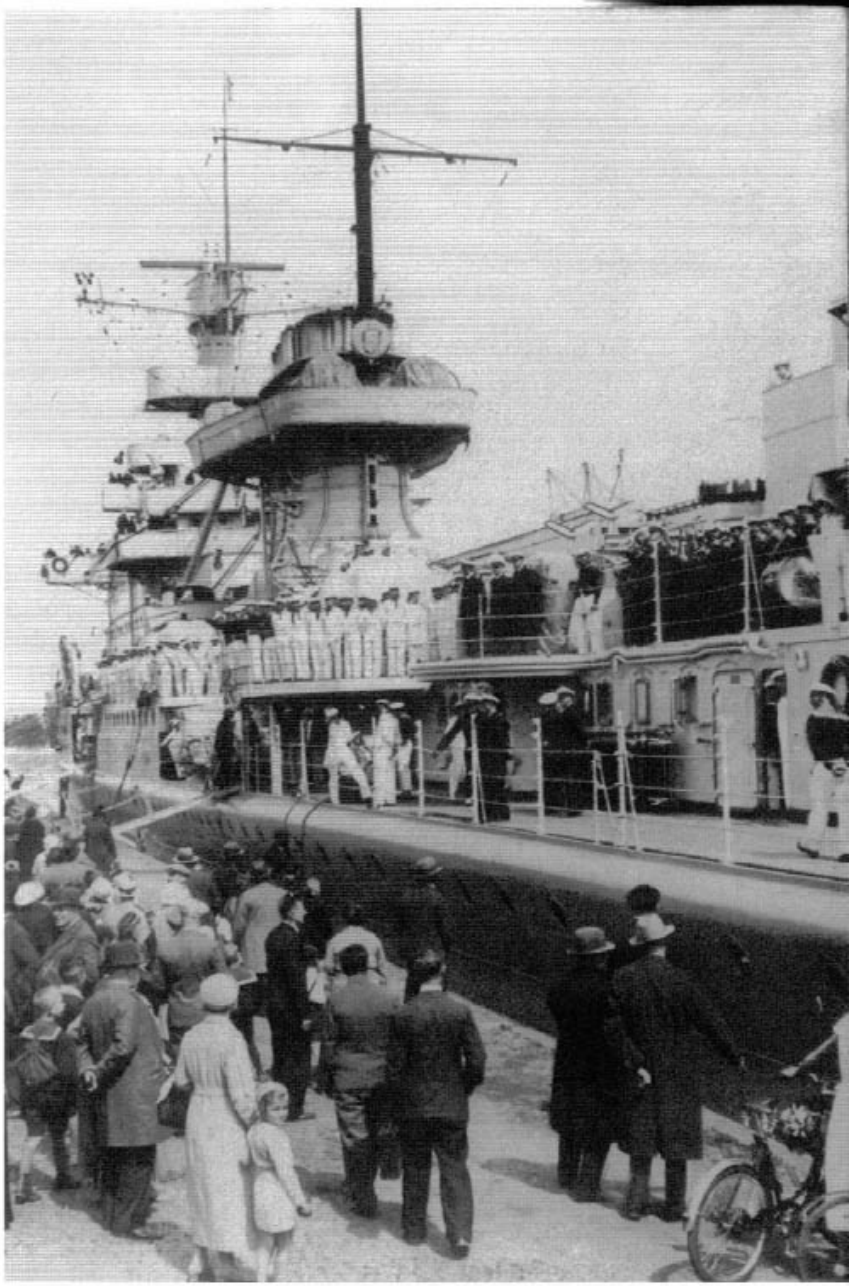
NÜRNBERG steams off the German coast during the late 1930s. Her namesake city's coat-of-arms are displayed on the bow, just ahead of the anchor. German warships removed their bow shields when World War Two began as a security measure. Two rows of portholes ran along the hull sides. These provided light into hull spaces and allowed crews within the hull to look outside the ship. Interior porthole covers prevented light within the hull from escaping when the ship was operating in a blackout condition. Triple 53.3 CM (21-inch) torpedo tubes were mounted along NÜRNBERG's hull sides. One mount was located in the hull side cutout between her main mast and funnel, while another mount was placed within another hull side cutout further aft. Her B main turret is trained to starboard.

'Z' Plan

One reason no better design existed for NÜRNBERG was that the *Kriegsmarine* was deeply involved in efforts to implement the 'Z' Plan. This was a blueprint for transforming the German Navy into a world-class fleet. The 'Z' Plan was developed in late 1938 and formally approved on 1 March 1939. Among the hundreds of new vessels envisaged were 16 larger light cruisers and 22 small cruisers (*Spähkreuzer*; Scout Cruisers), which were essentially scaled-up destroyers.

The first six light cruisers of this plan were ordered and three of them were actually laid down. Remarkably, they wouldn't have been much of an improvement over NÜRNBERG, being neither significantly bigger nor better protected. They would have carried one fewer 15 CM (5.9-inch) gun, being designed to mount four twin turrets of the kind carried on the BISMARCK Class battleships as secondary armament. The *Spähkreuzer* would have been twice a destroyer's size, but smaller than any contemporary light cruiser. They were essentially unarmored and would have carried six 15 CM guns in the same twin turrets. The *Kriegsmarine* ordered three *Spähkreuzer*, of which one was laid down.

It is undoubtedly fortunate for the Germans, but not the Allies, that all were cancelled and broken up starting in 1941. It's hard to see how they would have contributed anything useful to the German war effort.

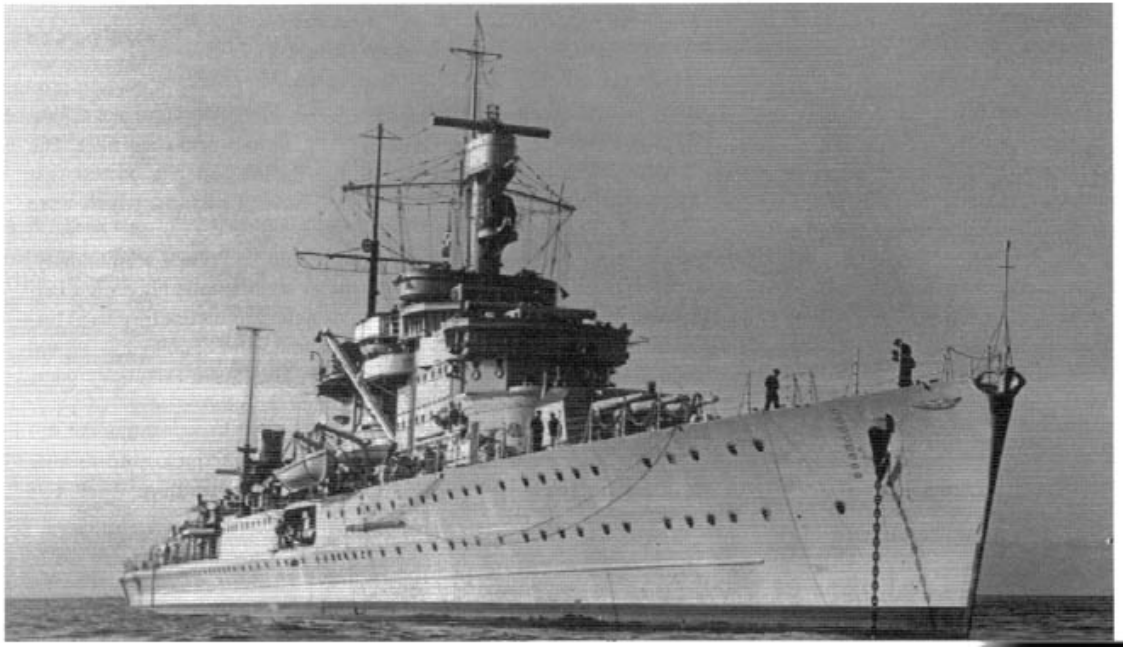


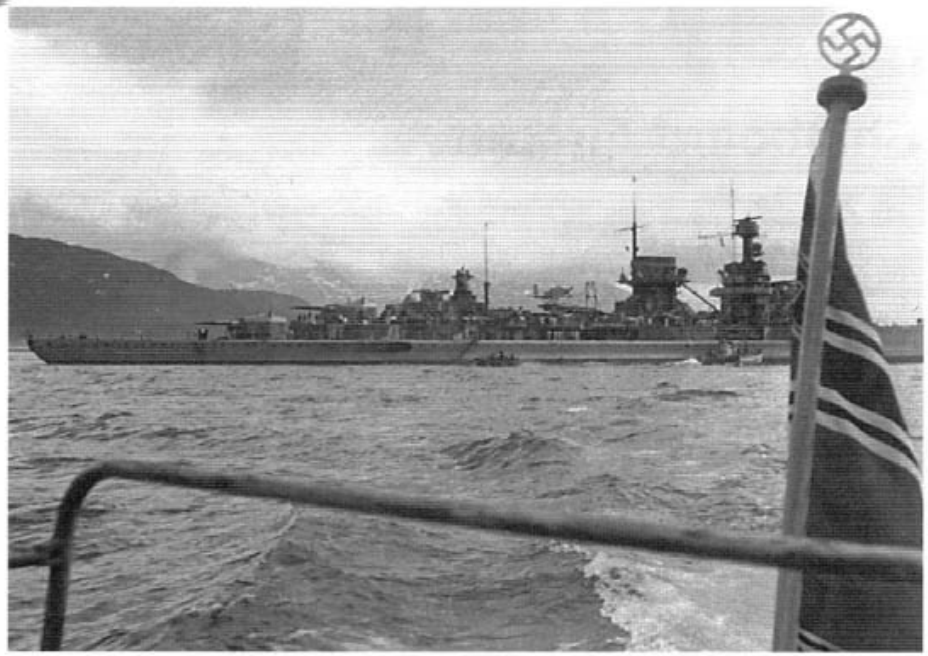
NÜRNBERG had two features that immediately distinguished her from her half-sister LEIPZIG. One was the prominent searchlight platform encircling her funnel, while the other was her catapult located aft of her funnel rather than forward. NÜRNBERG makes a port call in 1938. A small crowd of onlookers has gathered, awaiting a chance to go onboard. Her crew lines the rail and her band is playing, which entertains the gathering. (NARA)

The three 15 CM (5.9-inch) guns of NÜRNBERG's A (*Anton*) turret are elevated while the turret is slewed to port. Elevation limits for these guns were +40° to -10°. Two reels of hoses and one of rope are located immediately ahead of A turret. A searchlight is mounted on the foremast immediately under the upper observation platform. (BAK)

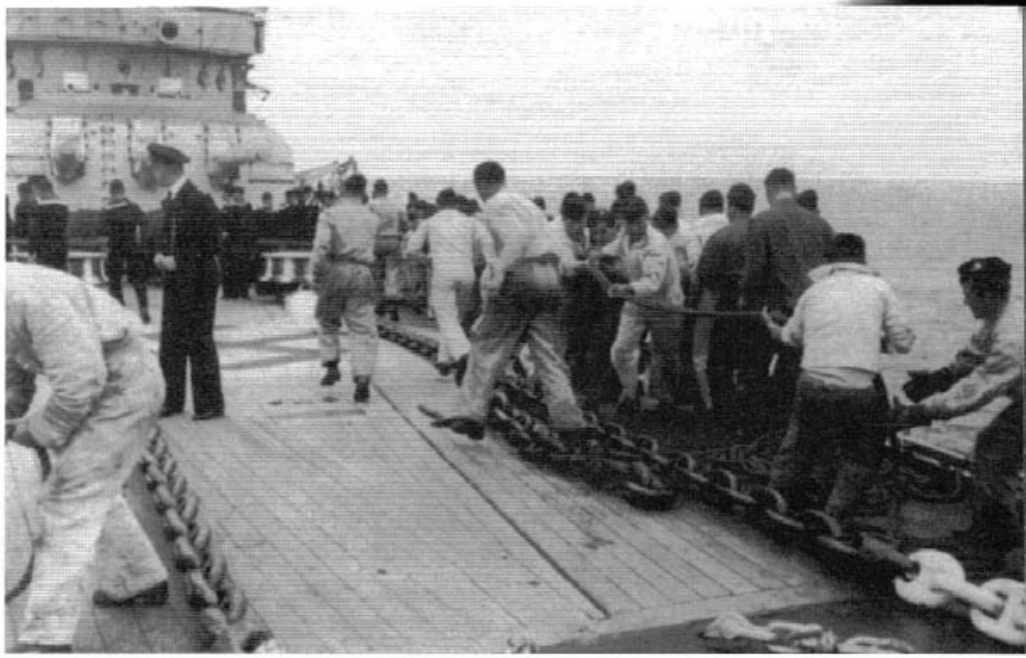
Sailors swab NÜRNBERG's quarterdeck while she is docked in an unidentified harbor. Both NÜRNBERG and her half-sister LEIPZIG had their B (*Berta*) and C (*Cäsar*) turrets mounted on the centerline. This was in contrast to the staggered B and C turrets of the earlier 'K' Class cruisers. A Black swastika on a White disc is painted on the quarterdeck for aircraft recognition purposes. (BAK)

NÜRNBERG was less damaged by the torpedo attack on 13 December 1939. She actually returned to active duty, unlike LEIPZIG. Probably the most obvious change in NÜRNBERG's appearance in this 1940 view is the addition of a degaussing cable just above the armor belt along the hull side. (NHC)





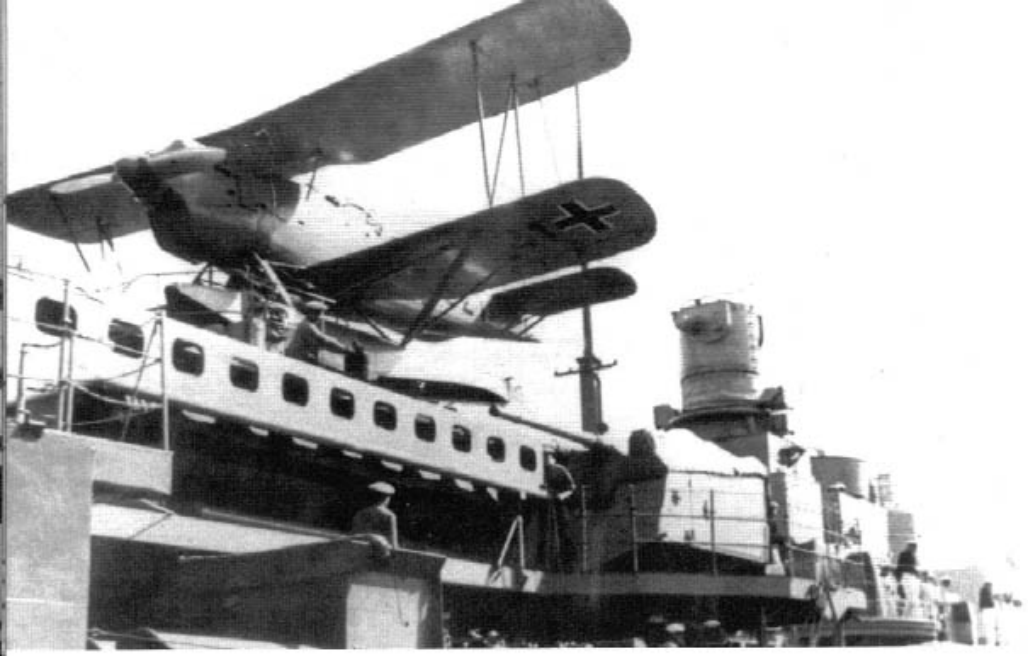
NÜRNBERG was deployed to Norway briefly in June of 1940 and then escorted the battleship GNEISENAU back from Trondheim to Kiel in July. Stains from the diesel exhaust vent appeared on the hull side just forward of the aft turrets. An Arado Ar 196 monoplane had replaced the Heinkel He 60 biplane on her catapult. (NARA)



A crew of sailors pull lines on NÜRNBERG's forecastle while she operates off Norway in the Fall of 1940. They are stepping around the anchor chains, which extend aft to windlasses mounted forward of A turret. A White disc with a Black swastika is painted on her deck. (BAK)

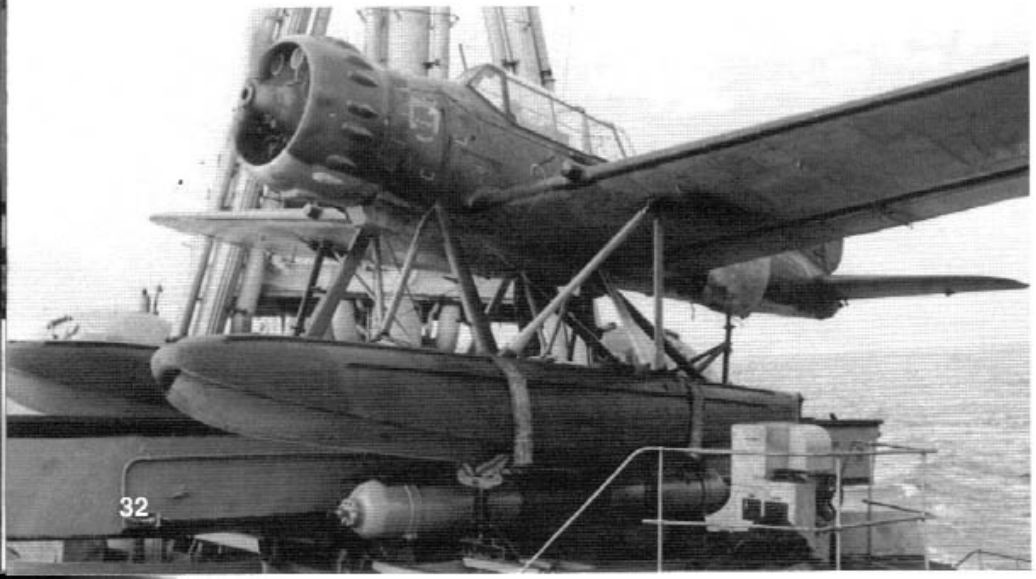
NÜRNBERG was used as a training ship in the Baltic Sea in the Autumn of 1941. She wore the Black and White striped camouflage typical of ships in the Baltic until 1942. The bow and stern are painted Dark Blue-Gray. Typically, ships in the Baltic had Red turret tops. Apparently venting the diesel exhaust through the hull side wasn't completely satisfactory, because the vertical exhaust pipes reappeared on NÜRNBERG at this time. (Via Ken Macpherson)

NÜRNBERG was redeployed to Norway in November of 1942. Ships deployed to Norway spent most of their time in fjords with a snowy landscape as the visual background. This fact and the fact that submarines were considered the greater threat at the time resulted in a camouflage intended to make ships hard to see against the land. NÜRNBERG had hard-edged Medium Gray and Dark Blue-Gray patches on her Light Gray hull. Her superstructure is primarily Dark Blue-Gray with Light Gray stripes. She is equipped with the FuMO 22 antenna, while the catapult was removed from aft of the funnel.



This Heinkel He 60C on NÜRNBERG was almost certainly part of *Bordfliegergruppe* (Shipboard Aircraft Group) 196. One of the Group's two *Staffeln* (Squadrons) was based at Wilhelmshaven, while the other was based at Kiel. Both Squadrons flew He 60Cs from their inception in 1937 until they converted to the Arado Ar 196 starting in late 1939. The aircraft was painted in the prewar RLM 63 Light Gray (FS36373) scheme. (Via Bob Cressman)

The engine is being warmed up on this Ar 196A-4 aboard ADMIRAL HIPPER. She is operating in the Atlantic in December of 1940. This was part of daily maintenance. The aircraft is clearly not being readied for launch, as it is still strapped down and a canvas cover remains on the fuselage. This Ar 196A-4 was assigned to 5. *Staffel*/*Bordfliegergruppe* 196, whose insignia is painted aft of the cowling. (BAK)



Shipboard Aircraft

All *Kriegsmarine* cruisers except for EMDEN were equipped to launch and recover aircraft at some point in their service lives. Only NÜRNBERG and the heavy cruisers ADMIRAL HIPPER, BLÜCHER, and PRINZ EUGEN were completed with aircraft handling facilities. The three heavy cruisers were the only ships equipped with hangars for storing aircraft beyond the one on the catapult. The aircraft on the catapult was ready for use at short notice.

Installing catapults on the light cruisers was always problematic, both because the added top weight degraded their already poor handling and because it was questionable whether ships clearly unsuited for open ocean operations needed scouting aircraft. Regardless of which argument won out, the illogic of retaining these facilities became obvious and catapults and aircraft were removed from all light cruisers before or during World War Two.

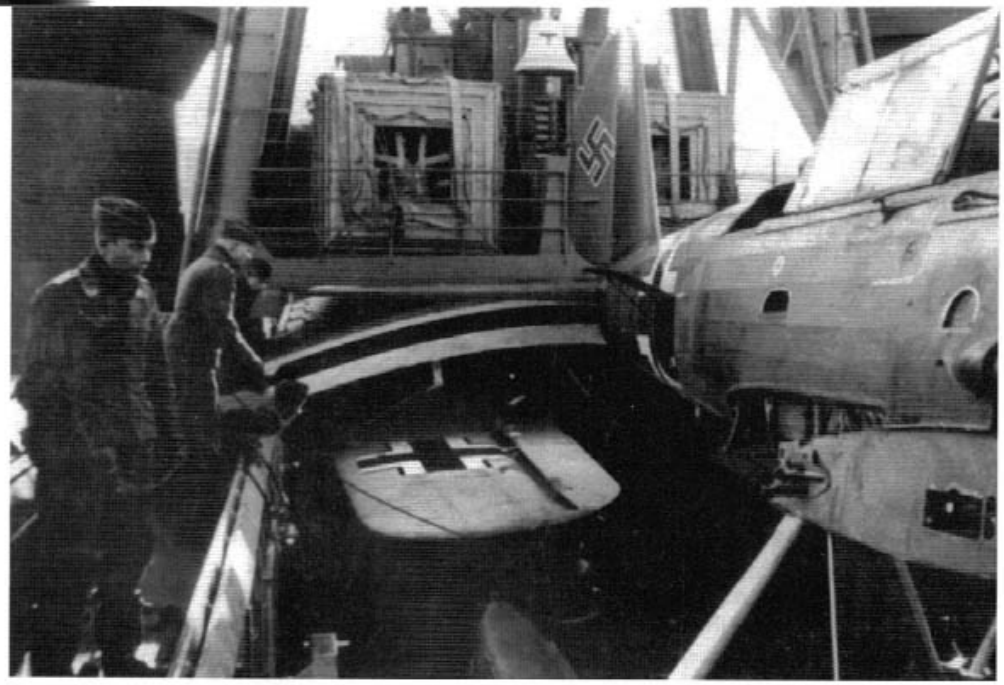
Interestingly, KÖLN was fitted with a 15 M (49-foot 2.6-inch) by 15 M square wooden platform atop her B turret in 1941. This was used for testing the feasibility of operating the Flettner Fl 265 scouting helicopter. This aircraft proved capable of operating from the ship and the more advanced Fl 282 was ordered into mass-production, but less than 30 Fl 282s were produced. The only known Fl 282 operational deployment was on the minelayer DRACH (aka SCHIFF 50, ex-Yugoslav ZMAJ) in the Adriatic Sea. The wooden platform was removed from KÖLN sometime in early 1942.

Two aircraft types were deployed on German cruisers, besides the Flettner prototype:

Heinkel He 60C – The *Reichsmarine* adopted the He 60C biplane as its standard scout floatplane in mid-1933. It was the shipboard aircraft fitted to each of the light cruisers as aircraft facilities were added. The He 60C had a maximum span of 12.92 M (42 feet 4.7 inches), a length of 11.5 M (37 feet 8.75 inches), and a height of 4.94 M (16 feet 2.5 inches). Its empty weight was 2410 KG (5313 pounds) and the maximum weight was 3556.2 KG (7840 pounds). A 660 HP BMW VI6,0 ZU 12-cylinder liquid-cooled inline engine powered the He 60C to a maximum speed of 225 KMH (140 MPH) at 1000 M (3281 feet). Its service ceiling was 5000 M (16,404 feet), while its maximum range was 769 KM (478 miles) at 2000 M (6562 feet). Its normal two-man crew consisted of a pilot and an observer/radio operator/rear gunner. The standard weapons fit was a single 7.92MM MG 15 machine gun in a flexible rear-facing mount at the observer's position.

Flettner Fl 265 – The first Fl 265 prototype flew in 1940. It looked like a stubby, wingless scout aircraft with a large tail and a pylon rising above the extensively glazed cockpit. The 150 HP Bramo Siemens Sh 14B seven-cylinder air-cooled radial engine powered two 12.3 M (40-foot 4.25-inch) diameter two-bladed counter-rotating rotors. The engine was mounted in the aircraft's nose, which looked 'normal' except there was no propeller. The Fl 265 was 2.82 M (9 feet 3 inches) tall to the pylon's top and 6.16 M (20 feet 2.5 inches) long. Its maximum forward speed was 150 KMH (93 MPH), with a service ceiling of 4100 M (13,451 feet) and a maximum range of 300 KM (186 miles). Empty weight was 800 KG (1764 pounds) and maximum weight, including the one-man crew, was 1000 KG (2205 pounds).

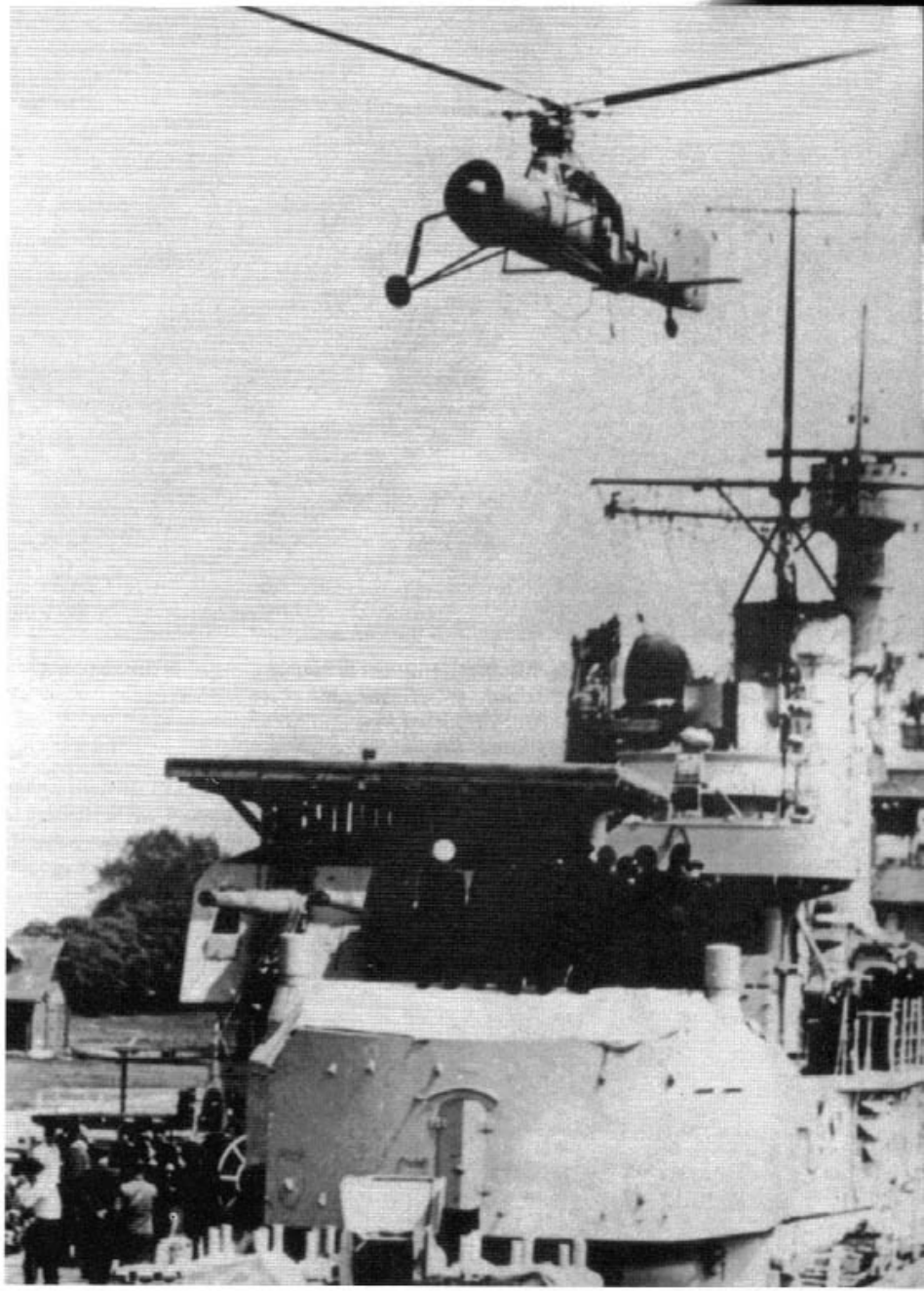
Arado Ar 196A – The Ar 196A was ready for deployment in June of 1939. It was the only shipboard aircraft to be carried on the ADMIRAL HIPPER Class heavy cruisers and it replaced the He 60C on at least NÜRNBERG. It was a low-wing, twin-float monoplane. The Ar 196A-3 had a maximum span of 12.44 M (40 feet 9.8 inches), a length of 11 M (36 feet 1.1 inches), and a height of 4.45 M (14 feet 7.2 inches). Its empty weight was 2335 KG (5148 pounds) and maximum weight was 3303 KG (7282 pounds). A 960 HP BMW 132K nine-cylinder radial air-



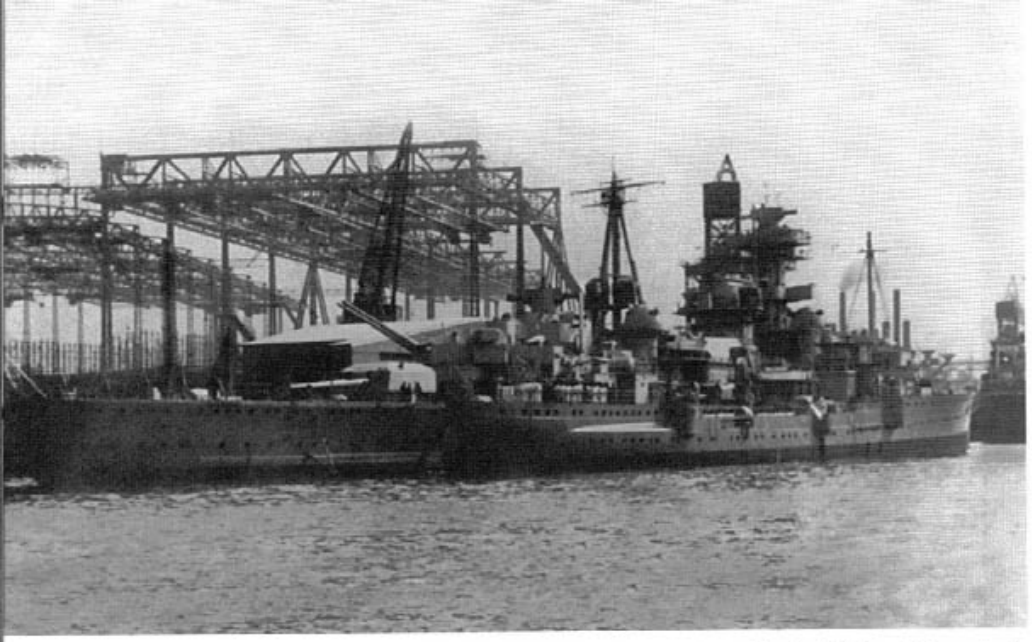
An Arado Ar 196 is either being placed into or taken out of PRINZ EUGEN's hangar. This occurred while the heavy cruiser operated in the Baltic in 1944. The hangar's roof retracted during aircraft extraction and insertion. There was room for two aircraft in the hangar, with the wings detached and stowed separately. (NHC)

cooled engine powered this aircraft. The Ar 196A-3 had a maximum speed of 312 KMH (194 MPH) at 1000 M. Its service ceiling was 7000 M (22,966 feet) and its maximum range was 800 KM (497 miles). The two-man crew was a pilot and an observer/radio operator/rear gunner. The Ar 196A-3 was armed with two fixed forward-firing 20MM MG FF cannon, a single fixed forward-firing 7.92MM MG 17 machine gun, and a single 7.92MM MG 15 in a flexible rear-facing mount at the observer's position. It also could carry two 50 KG (110-pound) SC 50 bombs on ETC 50/VIII racks under the wings.

The Ar 196 proved to be a reliable aircraft that was small enough to handle easily onboard and easy to fly and taxi on water. One of PRINZ EUGEN's Arados is being launched in the Baltic in 1944. The aircraft were used to spot the fall of shot during shore bombardment. (NHC)



A Flettner Fl 282 helicopter approaches the platform atop KÖLN's B turret. This light cruiser hosted trials with the Flettner helicopters in 1941 and early 1942. These successful tests proved that helicopters could operate off the ship in most weather conditions. The helicopters' slow speed and short range were offset by the ease with which they operated from the ship. This was far less disruptive of ship routine than the launching and recovery of floatplanes.



Fitting out nearly complete, ADMIRAL HIPPER is tied up alongside the Blohm & Voss dock in Hamburg in mid-1939. The old light cruiser AMAZONE, now an accommodations hulk, is tied up alongside. ADMIRAL HIPPER's fore and aft topmasts are lowered for passage under bridges to the sea. (Via Bob Cressman)

ADMIRAL HIPPER is seen in her 'as completed' condition in the Summer of 1939. She still has the straight stem and uncapped funnel. These would be modified during her post-trials refit, which lasted from November of 1939 to January of 1940.

ADMIRAL HIPPER Class

The heavy cruiser was a new type of ship that emerged from the 1922 Washington and 1930 London Naval Agreements. These vessels displaced up to 10,000 long tons (11,200 short tons/10,161 MT) and were armed with 20.3 CM (8-inch) guns. All the signatories of those treaties – Great Britain, the United States, Japan, France, and Italy – built ships of this type starting in the 1920s, with varying degrees of success. Germany, still bound by the Versailles Treaty, was excluded from this process. The Anglo-German Naval Agreement of 1935, which allowed the Germans 35 percent of the Royal Navy's tonnage overall and by category, effectively ended all meaningful restrictions on the *Kriegsmarine*'s size or make-up. This allowed the Germans to build up to five 'treaty' cruisers. (The total allowable tonnage of heavy cruisers under the agreement was over 51,000 long tons.) The Germans informed the British of their intent to start work immediately on the first two of these. This was news to no-one, since these cruisers had been in the design process for a year and a half. The first of them, Cruiser 'H' ('ERSATZ HAMBURG'), was laid down at Blohm & Voss shipyard in Hamburg 11 days before the agreement was formally signed.

The original draft design called for a ship of 10,000 long tons, a speed of 33 knots (38 MPH/61 KMH), eight or nine 15.2 CM (6-inch) guns, a range of 12,000 NM (13,818 miles/22,238 KM), and adequate armor. This set of characteristics were arrived at by looking at the French ALGÉRIE and Italian ZARA Class cruisers, which were the newest and most successful of the treaty cruisers built to date. This feature set proved impossible to fit into a hull of that displacement and the final design to which the first two cruisers were built involved reductions or compromises in almost all areas. Cruiser 'H' (named ADMIRAL HIPPER at launch) and Cruiser 'G' ('ERSATZ BERLIN' – named BLÜCHER at launch) ended up somewhat slower, less well protected and significantly shorter-ranged than planned on a displacement that exceeded the design goal. ADMIRAL HIPPER was commissioned into the *Kriegsmarine* on 29 April 1939, followed by BLÜCHER on 20 September 1939.

The *Kriegsmarine* ordered the three remaining cruisers, 'J', 'K' and 'L' (which became PRINZ EUGEN, SEYDLITZ, and LÜTZOW, respectively) in 1935 and 1936. By that time, all restraints had been removed and these ships grew in size in all dimensions and in displacement by nearly 1000 tons. Armor, armament, and speed stayed the same, although there was a 14 percent improvement in range.

Only PRINZ EUGEN was completed from this group. She was commissioned on 1 August 1940. The Soviets, allies of the Germans by this time, showed keen interest in all three ships. The Germans dragged out the negotiations and finally let the Soviets have LÜTZOW, the least complete of the three. She was towed to Leningrad (now St. Petersburg, Russia) starting on 15 April 1940. Her hull was complete, but little of her superstructure was in place. LÜTZOW's A and D turrets were in place, but only the former had guns. These were used in the defense of Leningrad from mid-1941 into 1944. SEYDLITZ was retained, although work proceeded slowly. This was originally because it appeared that World War Two would be won before she could be completed. Later, when the prognosis changed, it became unclear how another heavy cruiser would contribute to victory. Talk of converting SEYDLITZ into an aircraft carrier began even before her launch. After the battleship BISMARCK was lost in May of 1941, the *Kriegsmarine*'s glaring lack of shipboard aviation led to the decision on 26 August 1942 to proceed with converting the incomplete cruiser. The dismantling of her nearly completed upperworks proceeded rapidly, but the steadily worsening war situation led to the realization that, even if she could be completed, a single, small aircraft carrier was unlikely to be very useful. Work on SEYDLITZ was suspended in January of 1943, never to be resumed.

Both ADMIRAL HIPPER and BLÜCHER were launched with a waterline length of

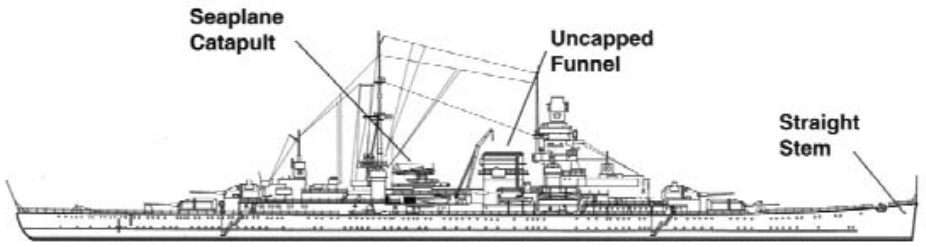
194.2 M (637 feet 1.7 inches) and an overall length of 202.8 M (665 feet 4.25 inches). Their beam was 21.3 M (69 feet 10.6 inches) and their draft at operational load was 7.74 M (25 feet 4.7 inches). Both were launched with straight, nearly vertical stems, which were soon converted to the more raked and curved 'Atlantic' bow form. ADMIRAL HIPPER's was converted in November of 1939, after she'd been in service six months and had seen some war duty in the Baltic. BLÜCHER had her bow converted prior to her commissioning in September of 1939. The two sisters' bow shape after conversion wasn't the same. ADMIRAL HIPPER's new bow had a moderate rake and flare, but retained a nearly straight profile; BLÜCHER's had more rake and considerable curve in profile. Both beam and draft were unaffected by the new bow. Waterline length increased to 194.6 M (638 feet 5.4 inches) and overall length to 205.9 M (675 feet 6.3 inches). Full load displacement was approximately 18,200 tons.

PRINZ EUGEN and her incomplete sisters were larger in all dimensions. PRINZ EUGEN was also launched with a straight stem, and – like BLÜCHER – was given a raked and curved 'Atlantic' bow before her commissioning on 31 July 1940. With the new bow, her dimensions were 199.5 M (654 feet 6.3 inches) long at the waterline and 212.5 M (697 feet 2.1 inches) long overall. She was 21.9 M (71 feet 10.2 inches) at the beam and 7.95 M (26 feet 1 inch) deep at operational load. Full load displacement was approximately 19,000 tons.

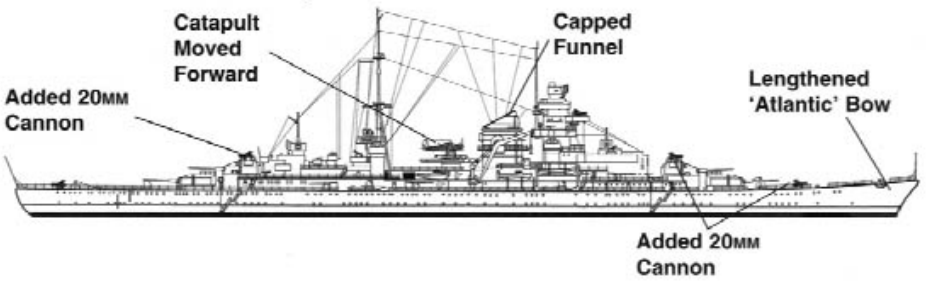
All three completed cruisers were fitted with 12 high-pressure watertube boilers. (LaMont made ADMIRAL HIPPER's and PRINZ EUGEN's boilers, while Wagner made BLÜCHER's.) During the design phase, some consideration was given to repeating the mixed propulsion layout of the newer light cruisers, but this was rejected due mainly to a strong anti-diesel bias on the part of many in the *Kriegsmarine*'s higher ranks. The high-pressure steam systems used in these ships were highly experimental and proved in practice to be prone to frequent failures, particularly as the war progressed and the standards of maintenance declined. (ADMIRAL HIPPER's system worked at 85 atms[1]; the other two worked at 70 atms.) This steam drove three sets of geared turbines attached to three shafts. Blohm & Voss made ADMIRAL HIPPER's and BLÜCHER's turbines, while Germania built PRINZ EUGEN's.

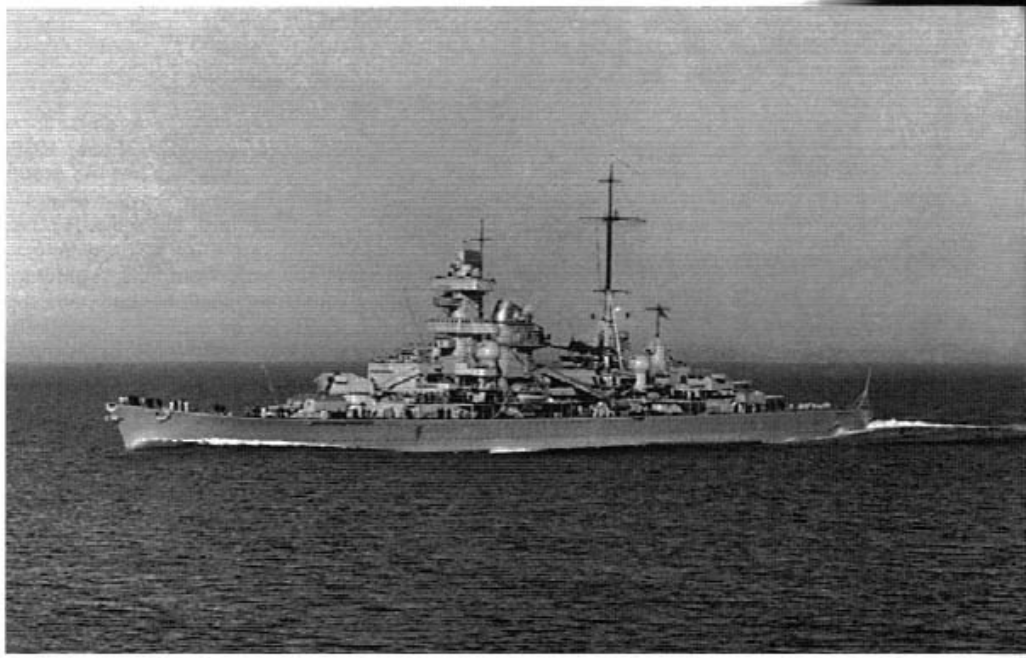
[1]atm: Atmospheres pressure. One atm equals 101.325 kilopascal (kPa) (14.7 pounds per square inch).

ADMIRAL HIPPER, 1939



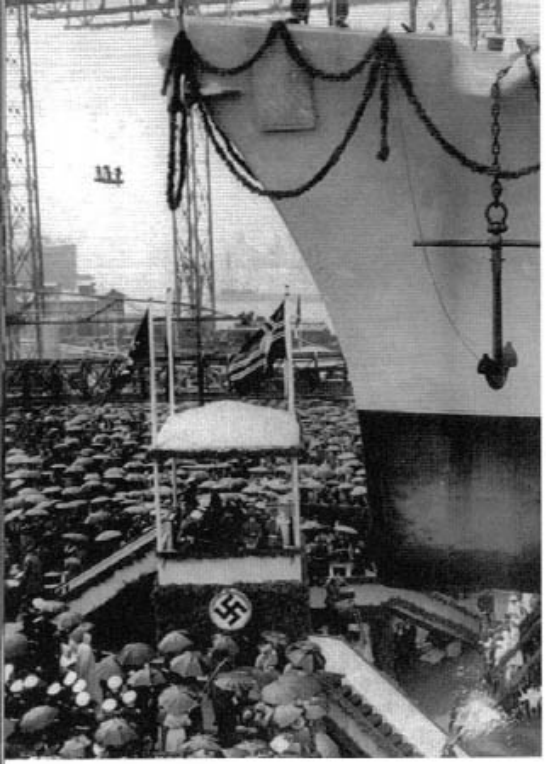
PRINZ EUGEN, 1942





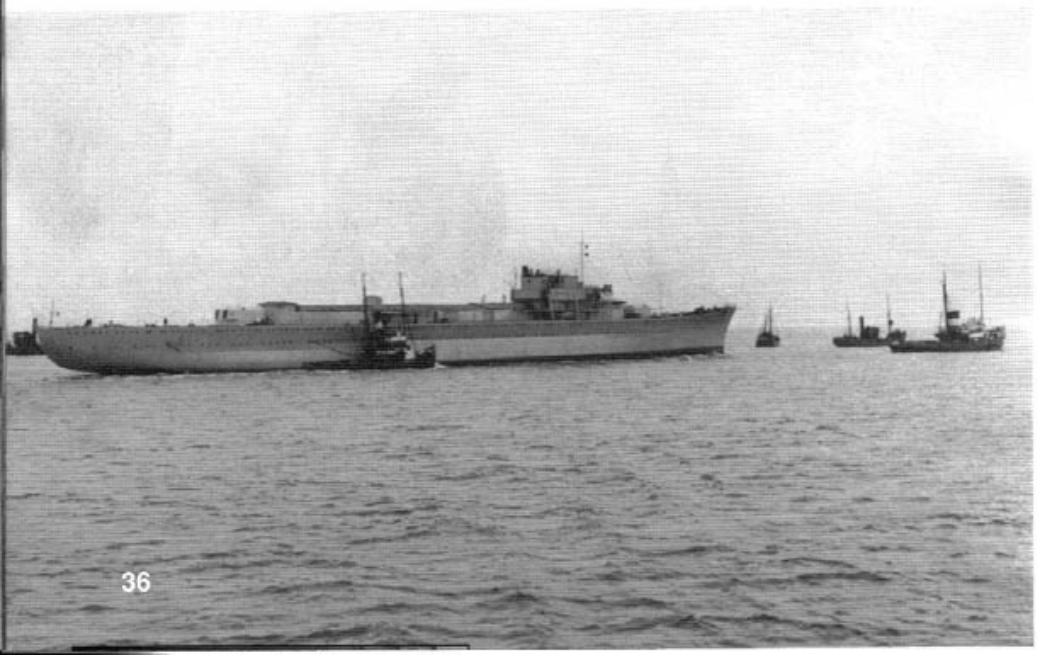
BLÜCHER steams on her trials in the Baltic, after her last refit, probably in March of 1940. She has the full *Atlantikbug* (Atlantic bow), both raked and curved, and a funnel cap as tall as that on ADMIRAL HIPPER. BLÜCHER has been fitted with a FuMO 22 radar whose antenna can be seen on the front face of a cupola built atop the foremast rangefinder.

All ADMIRAL HIPPER Class ships had a bulge at the forefoot, as can be seen in this view of PRINZ EUGEN at her launch on 22 August 1938. This bulge had multiple benefits, which included reducing drag and increasing pitch stability by adding buoyancy at the bow. Nevertheless, even with the modified Atlantic bow, these were wet ships in any seaway. (NHC)



Dignitaries and guests gather for the launch of SEYDLITZ at Bremen on 19 January 1939. She was the second ship in the second group of ADMIRAL HIPPER Class heavy cruisers – after PRINZ EUGEN and before LÜTZOW. These three ships were fitted with the lengthened clipper-type bow from the beginning. The anchor at her bow was lowered once the ship was launched to slow her rearward motion. This was larger than her normal service anchors. The bow shield with SEYDLITZ's coat-of-arms was covered on the bow, but uncovered when she was christened. The hull above the waterline was painted *Schiffsbodenfarbe 31$_2$ Dunkelgrau* (Ship's Camouflage Color 31$_2$ Dark Gray), while the hull below the waterline was painted *Schiffsbodenfarbe I 22a Rot* (Ship's Camouflage Color I 22a Red). The boot topping on the waterline was *Wasserlinienfarbe I 23a Grau* (Waterline Color I 23a Gray). (NHC)

The partially completed heavy cruiser LÜTZOW is on her way to the Soviet Union on 15 April 1940. Only A (*Anton*) turret was complete, but the Soviets used these 20.3 CM (8-inch) guns against the Germans in the defense of Leningrad (now St. Petersburg). German forces besieged Leningrad from 8 September 1941 until Soviet forces lifted the siege on 27 January 1944 – 900 days later.



Maximum speed was 32.5 knots (37.4 MPH/60.2 KMH) at 132,000 SHP. Range was a disappointing 6800 NM (7830 miles/12,601 KM) at 19 knots (21.9 MPH/35.2 KMH) for ADMIRAL HIPPER. PRINZ EUGEN, with somewhat larger bunkers and operating at lower steam pressure, achieved 7850 NM (9039 miles/14,547 KM) at 19 knots.

The armor fitted in this class was thin by the standards of contemporary heavy cruiser design. The belt had a maximum thickness of 80MM (3.15 inches). (Contemporary designs in the US Navy had belt armor of up to 152MM/6 inches.) An armored deck 50MM (2 inches) thick slanted downward to the top of the belt. The armor used was primarily Wh (*Wotan hart*; Wotan hard) steel.

The complement of these ships varied between 1350 and 1600 men. For example, PRINZ EUGEN had 1400 men during Operation RHEINÜBUNG (RHINE EXERCISE) – the 1941 breakout with BISMARCK to the North Atlantic. This complement included 64 officers, 76 warrant officers, 408 Non-Commissioned Officers (NCOs), and 852 other ranks.

The ADMIRAL HIPPERs' main battery consisted of eight 20.3 CM (8-inch) SK C/34 naval rifles in four twin-turrets superfiring fore and aft. The symmetrical arrangement of the main armament was the same as found on the BISMARCK Class battleships. There was no specific intent to make the two classes look alike, but it turned out that they could easily be confused at a distance. Not only was the turret arrangement similar, but both classes also had a single funnel and a large tower mast forward. In fact, they looked so similar in the half-light and mist of the Denmark Straits that the British mistook PRINZ EUGEN for BISMARCK and for several crucial minutes directed their fire at the less dangerous of the two ships.

The main guns were the only 8-inch guns ever made by the German Navy. This 60-caliber weapon was designed in 1934 and entered service only with the ADMIRAL HIPPER Class cruisers. They fired 122 KG (269-pound) shells at 925 M (3035 feet) per second. Projectiles included Armor-Piercing Capped (APC) and two forms of High Explosive (HE) shells. Maximum range was 18.32 NM (21.1 miles/34 KM) at 37° elevation.

The *Flak* (*Flugzeugabwehrkanone*; Anti-Aircraft Gun) suite originally included twelve 10.5 CM (4.1-inch) 65 caliber guns in six C/33 stabilized mounts, twelve 3.7 CM (1.5-inch) 83 caliber cannon in six C/30 twin mounts, and eight 2 CM (0.8-inch) 65 caliber cannon in C/30 single mounts. In the two ships that survived to later in the war, extra medium and light *Flak* weapons were mounted. This included exchanging the single 2 CM weapons for twin or quadruple 2 CM mounts. For the 1942 Channel Dash (Operation CERBERUS), PRINZ EUGEN temporarily carried five Army model 2 CM quad mounts.

These ships carried twelve 53.3 CM (21-inch) diameter torpedo tubes in four triple mounts, the forward pair abreast the forward tower mast and the aft pair abreast the mainmast. The torpedoes were the G7a model carried by the earlier cruiser classes. These torpedo tubes remained throughout the war, but it is known that PRINZ EUGEN landed her torpedoes before CERBERUS and it is not known if they were ever shipped again.

Main battery fire control was provided by four 7 M (23 feet) optical rangefinders. One was located on the forward tower mast and another on the aft control position. B and C turrets (the superfiring turrets fore and aft, respectively) each had a rangefinder built into the rear of the turret. There was a 6 M (19 feet 8.2 inches) rangefinder on the roof of the forward conning tower. Additionally, there were four *Flak* control positions with their distinctive spherical hoods located abreast the forward tower mast and the mainmast. These each had a 4 M (13 feet 1.5 inch) rangefinder. These positions were unstabilized on both ADMIRAL HIPPER and BLÜCHER. A newer model was fitted in PRINZ EUGEN, which incorporated gyroscopic stabilization in three dimensions.

PRINZ EUGEN was fitted with a sophisticated hydrophone array called GHG

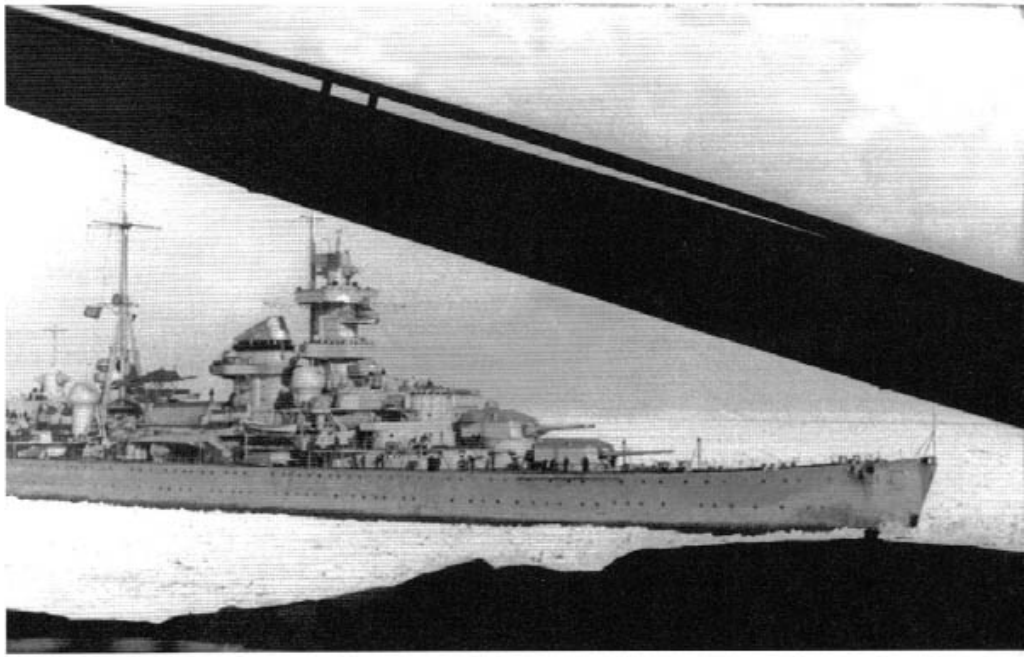
(*Gruppenhorchgerät*; Group Hydrophone) in August of 1940. This was the ancestor of the passive sonar devices commonly fitted to major warships today. Post-war US Navy tests showed that with the cruiser moving at 20 knots (23 MPH/37 KMH), GHG could detect a submarine's screws at 15 NM (17.3 miles/27.8 KM).

ADMIRAL HIPPER and BLÜCHER were both fitted with a FuMO 22 radar early in the war. Its 2 M (6 feet 6.7 inches) high by 6 M (19 feet 8.2 inches) wide mattress-type antenna was mounted on a new cylindrical cupola built atop the tower mast rangefinder. ADMIRAL HIPPER's installation was made during her completion work that ran from 6 November 1939 to 12 January 1940. BLÜCHER's was added during her completion period, 28 January – 30 March 1940. Late in 1941 or early in 1942. ADMIRAL HIPPER had a FuMO 27 added in the after control position, with its associated 2 M high by 4 M (13 feet 1.5 inches) wide mattress-type antenna. At the same time, a FuMO 27 replaced the forward radar and the earlier antenna replaced by the new radar's smaller antenna. Also at that time, a *Timor* (FuMB *Ant* 7) antenna was mounted on the rear face of the cupola. This antenna, a mattress fitted with eight vertical and four horizontal broadband dipoles loops, was most often associated with a FuMB 1 *Metox* radar detector. Photographic evidence indicates that late in 1944, at least the forward FuMO 27 was replaced by a FuMO 26 with its 3.2 M (10 feet 6 inches) high by 6.6 M (21 feet 7.8 inches) wide antenna. This radar had enough power to create a narrow beam (0.25°) with some utility in fire control. The *Timor* antenna appears to have been removed. This was no doubt because the *Metox* set it likely served had by then been withdrawn from service. There are reports that ADMIRAL HIPPER had an additional FuMB 25 set mounted on her mainmast in 1945. Post war views show evidence of a platform for an antenna for this radar, but not the antenna itself.

PRINZ EUGEN mounted radar antennas on both the fore and aft control top rangefinders when she entered service in August of 1940. These were the 2 M high by 4 M wide mattress-type antennas associated with the FuMO 27 radar. In September of 1942, the forward FuMO 27 was removed, a cupola was added atop the foretop rangefinder, and a FuMO 26 radar was installed. The antenna used with the previous radar was retained and was moved to the upper face of the new cupola. Below that antenna, a *Timor* antenna was installed facing the same direction. FuMB *Ant* 4 *Sumatra* dipoles were installed on the four faces of the foretop platform. Separate, tilting send-and-receive lobes were added on either side of the FuMO 26 antenna to provide height-finding capability. These additional antennas were removed sometime in 1944, when a larger 3.2 M (10 feet 6 inch) high by 6.6 M (21 feet 7.8 inch) wide antenna was installed in the place of the previous antenna. The *Timor* antenna was removed at the same time. A FuMO 81 *Berlin-S* centimetric air search radar was installed at the forward masthead. Centimetric radars operate on wavelengths of approximately 0.01 M, with frequencies from 3 to 30 Gigaherz (GHz).

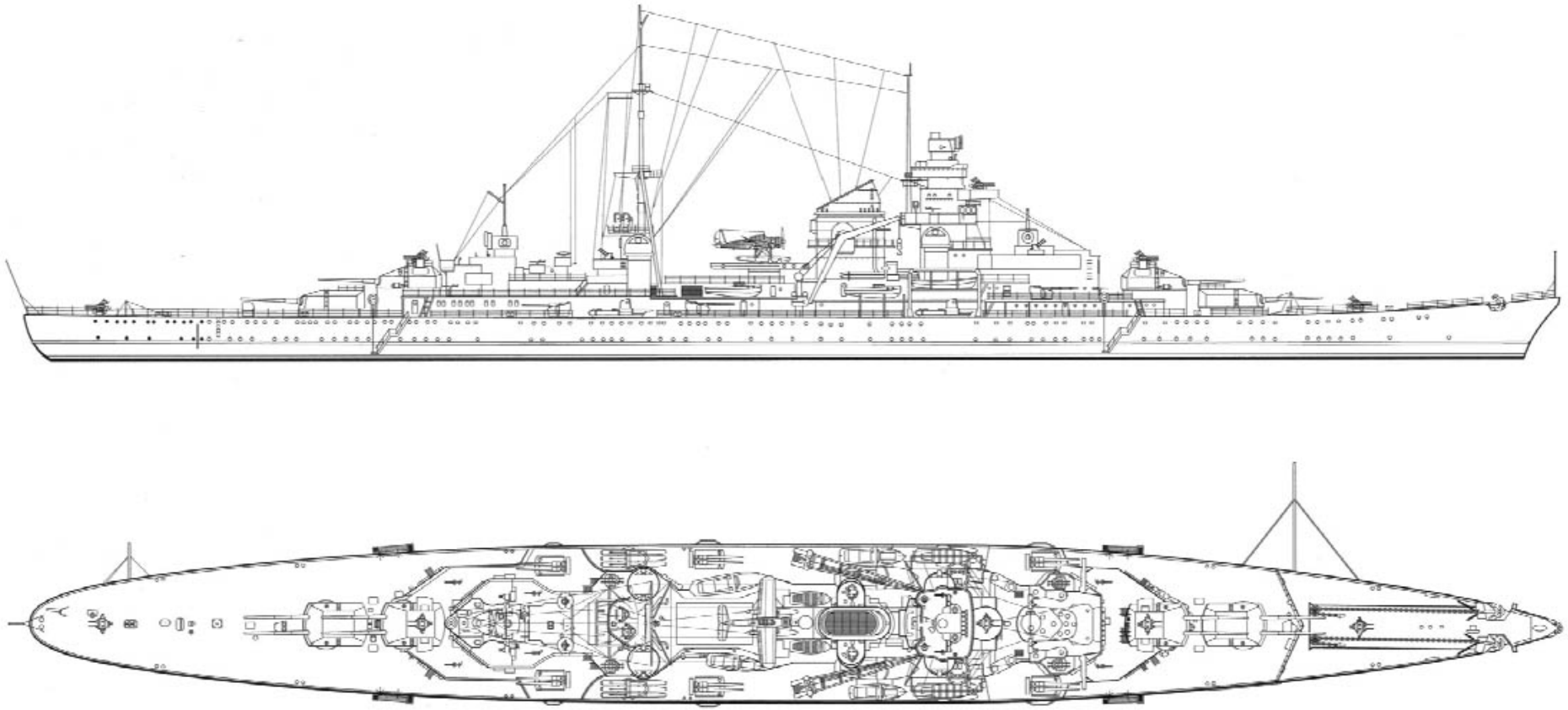
The three completed cruisers entered service with aircraft handling facilities located just aft of the funnel. The ships were designed to carry three aircraft, two in a hangar and one on the catapult, although in practice only two aircraft were generally shipped. On ADMIRAL HIPPER and BLÜCHER the catapult was aft of the hangar; on PRINZ EUGEN it was forward of the hangar.

The ADMIRAL HIPPER Class was by far the most successful of the *Kriegsmarine*'s cruisers. ADMIRAL HIPPER and PRINZ EUGEN both had careers that lasted until the end of World War Two. Alone among the cruisers built by the Germans after World War One, they represented a threat in the open ocean that the Royal Navy had to respect. BLÜCHER's loss was more a result of terrible *Kriegsmarine* decision-making than from flaws in her design.



ADMIRAL HIPPER emerged from her refit into one of the coldest winters on record and spent most of the next month locked in ice at Kiel. She now has the raked, but still straight, bow and the prominent funnel cap. ADMIRAL HIPPER also has a FuMO 22 radar antenna installed on her foremast. In early February of 1940, she transferred to Wilhelmshaven, where the ice problems were less severe. (NHC)

ADMIRAL HIPPER loads troops at Cuxhaven, Germany for transport to Trondheim, Norway as part of Operation WESERÜBUNG (WESER EXERCISE) on 6 April 1940. The mountain troopers are obviously a matter of some curiosity for the cruiser's crew, who line every available rail to get a good look. Main turret tops are painted Yellow and one 2 CM *Flak* cannon is mounted atop B (*Berta*) turret.



PRINZ EUGEN Specifications, 1942

Overall Length: .....212.5 M (697 feet 2.1 inches)
Beam: .....21.9 M (71 feet 10.2 inches)
Draft:.....7.95 M (26 feet 1 inch)
Standard Displacement: ....14,475 tons
Full Load Displacement: ..19,000 tons
Machinery: .....Twelve LaMont boilers, three Germania turbines, three screws
Speed: .....32.5 knots (37.4 MPH/60.2 KMH)
Range: .....7850 nautical miles (9039 miles/14,547 KM) at 19 knots (21.9 MPH/35.2 KMH)

Armament: .....Eight 20.3 CM (8-inch) SK C/34 guns in four twin mounts; twelve 10.5 CM (4.1-inch) SK C/33 guns in six twin mounts; twelve 3.7 CM SK C/30 cannon in six twin mounts; eight 2 CM *Flak* 38 cannon in single mounts, and 20 2 CM *Flak* 38 cannon in five quad mounts.
Aircraft: .....Three Arado Ar 196 floatplanes
Complement: 1400

Nevertheless, there were serious problems with this class' design. Despite their success on some sorties into the Atlantic, these ships were too short-ranged to succeed as commerce raiders. For example, ADMIRAL HIPPER's highly successful raid in March of 1941 lasted 15 days and involved steaming from France to the west of the Azores, southeast towards the Spanish coast and finally back to Brest, France. Six of those 15 days were spent with the tanker SPICHERN, so that the cruiser would have full tanks when a likely target was found. The 'rolling up' of the German Atlantic resupply network from late 1941 brought commerce raiding by the ADMIRAL HIPPER Class cruisers to an end. Throughout their careers, they suffered numerous problems related to their high-pressure powerplants.

At the end of the war, PRINZ EUGEN was – along with the few operational *Typ* XXI U-boats (*Unterseeboote*; submarines) – the *Kriegsmarine*'s most coveted asset. The Soviet Union, Great Britain, and the US all laid claim to the cruiser. In the general spirit of good will that lasted briefly after the war's end, it was finally decided that lots should be drawn to determine which country would claim the prize. The Americans won this bizarre exercise and she became USS PRINZ EUGEN (IX-300) on 5 January 1946. After stops at Boston, San Diego, and Pearl Harbor, she was sent to Bikini Atoll in the Marshall Islands. Her engines failed completely on the last leg of the voyage and she had to be towed across the Pacific. PRINZ EUGEN was a target for Operation CROSSROADS – the first post-war atomic bomb tests. She was anchored well away from Ground Zero for the first naval atomic bomb test (Able) on 1 July 1946 and she survived with no appreciable damage. Test Baker was an underwater explosion on 25 July. PRINZ EUGEN survived that one as well, but was so radioactive that plans to repair her were eventually abandoned. She was towed to Kwajelein Atoll where she gradually took on water and finally capsized on 22 December 1946.

ADMIRAL HIPPER Class Battle Histories:

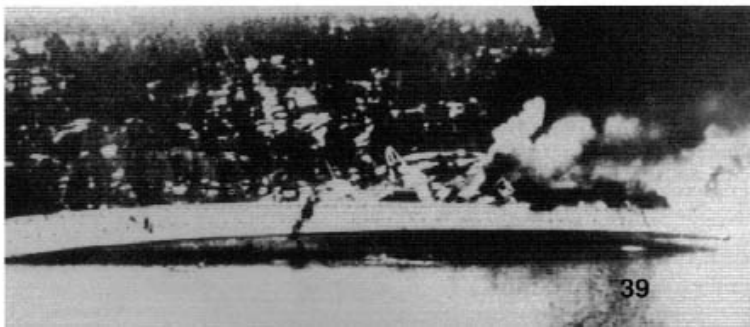
ADMIRAL HIPPER:

1 September 1939: Trials interrupted by assignment to operations off Danish coast (Belt) to prevent escape of Polish warships from Baltic.
Mid-September 1939: Resumed trials.
6 November 1939-12 January 1940: Post-trials refit
17 February 1940: Declared ready for combat.
18-20 February 1940: Operation NORDMARK (NORTH MARK) with battleships GNEISENAU and SCHARNHORST, a sortie into passage between Shetlands and Norway looking for convoys. Nothing found.
7 April 1940: Assigned to Group 2 (Trondheim) of Operation WESERÜBUNG (WESER EXERCISE; German invasion of Norway).
8 April 1940: Finds British destroyer HMS GLOWWORM returning from mining operation off Norway. Rammed by GLOWWORM, which is then sunk by gunfire.
10-12 April 1940: Returns to Wilhelmshaven with SCHARNHORST and GNEISENAU.
April-May 1940: Repairs.
4-10 June 1940: Operation JUNO with GNEISENAU and SCHARNHORST, a sortie against British troopships at Harstad, Norway.
8 June 1940: Sank RN trawler JUNIPER and troopship ORAMA by gunfire. Headed towards Trondheim to refuel.
20 June 1940: Sortied from Trondheim with GNEISENAU, but GNEISENAU was torpedoed and operation cancelled.
25 July-9 August 1940: Sortied to Arctic to cover GNEISENAU's return to Kiel. No successes. Return to Wilhelmshaven.
9 August-9 September 1940: Refit.
24 September 1940: Leaves Wilhelmshaven for sortie into North Atlantic, but off Norway suffers complete engine failure. Adrift for four hours before power restored.
30 September 1940: Arrives at Kiel for repairs.
30 November 1940: Leaves Brunsbüttel on Operation NORDSEETOUR (NORTH SEA

(Above) The British sent a force to lay mines off the Norwegian coast in the Spring of 1940. This was part of the stroke and counterstroke that led to the German invasion of Norway. On the way to Trondheim, ADMIRAL HIPPER ran into the British destroyer HMS GLOWWORM, which had stayed behind to rescue a man overboard. The resulting engagement was short, sharp, and fatal. GLOWWORM tried to ram ADMIRAL HIPPER, scraped her side, and then was sunk by short-range gunfire. (NHC)

(Right) ADMIRAL HIPPER disembarks troops while lying off Trondheim on 9 April 1940. The troops were loaded onto a lighter (barge) that then headed towards shore.

Warships are always vulnerable in narrow waters. This was a lesson the *Kriegsmarine* relearned when BLÜCHER got caught in the Drobak Narrows of Oslofjord on 9 April 1940. She was lost to Norwegian shore guns and fixed torpedo tubes. (NHC)



A destroyer escorts ADMIRAL HIPPER as she departs Trondheimfjord on 9 April 1940. The cruiser had only minor damage from the encounter with GLOWWORM. The forward portside 10.5 CM (4.1-inch) twin mount is already pointing skyward. The 3.7 CM twin mount, just above and inboard, sits just below its associated director. ADMIRAL HIPPER's voyage home went without incident.

After the end of Operation WESERÜBUNG (WESER EXERCISE), ADMIRAL HIPPER was rapidly repaired and reported ready for duty in May of 1940. Her upperworks were given an interesting three-color camouflage during this period. The name 'Glowworm' was painted on the side of A (*Anton*) turret, which is seen on the right in this view. The camouflage is carried up over the turret tops, which appear to retain the Yellow applied for the Norway invasion.

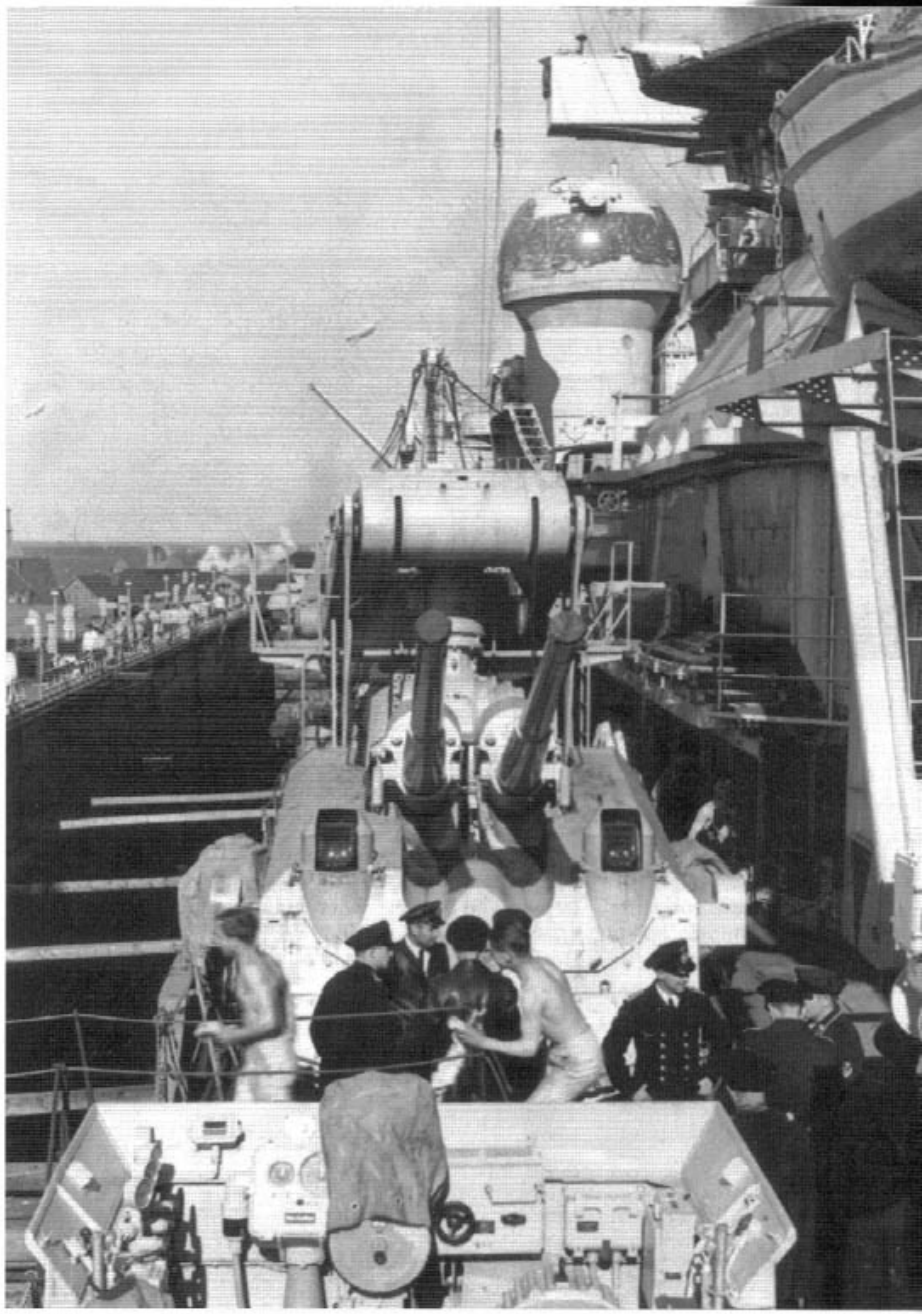
TOUR), breakout into North Atlantic. Refueled south of Jan Mayen Island.
6 December 1940: Broke through Denmark Strait. Refueled three times south of Greenland. Searched for convoys with no success.
24 December 1940: Finds troop convoy WS.5A west of Cape Finisterre. Damages British heavy cruiser HMS BERWICK and two troopships. Breaks off engagement due to engine problems. Later sinks freighter JUMNA.
27 December 1940: Arrives at Brest.
1 February 1941: Leaves Brest for North Atlantic.
11 February 1941: Directed to Allied convoy HG.53 by German submarine U-37. Sinks freighter ICELAND.
12 February 1941: Attacks unescorted convoy SLS.64. Approaches under *ruse de guerre* (trick of war; in this case, flies British White Ensign). Claims sinking of 14 of 19 ships and damage to two others. (Postwar records show actual loss was seven ships sunk and four damaged.)
15 February 1941: Enters Brest.
15 March 1941: Leaves Brest for Germany. Refuels mid-Atlantic.
23 March 1941: Passes Denmark Strait.
28 March 1941: Enters Kiel.
March-November 1941: Refit.
18 November 1941: Began working up new crew in Baltic.
21 December 1941: Entered yard at Gotenhafen (Gdynia) to address defects found during work up.
25 January-25 February 1942: Turbine refit at Blohm & Voss, Kiel.
2 March 42: Transferred to Brunsbüttel.
19-20 March 1942: Transferred to Trondheim.
2 July 1942: Transferred to Altafjord.
5 July 1942: Operation RÖSSELSPRUNG (HORSE JUMP) with armored ship ADMIRAL SCHEER and battleship TIRPITZ, sortied to attack Allied convoy PQ.17. Recalled before contact.
8 July 1942: Transferred to Bogen (Ofotfjord).
10 September 1942: Transferred to Altafjord with ADMIRAL SCHEER and light cruiser KÖLN.
24-28 September 1942: Operation ZARIN (TSARINA), mining off coast of Novaya Zemlya.
5 November 1942: Operation HOFFNUNG (HOPE), sortie against merchant traffic off North Cape.
30 December 1942: Operation REGENBOGEN (RAINBOW) with armored ship LÜTZOW (ex-DEUTSCHLAND), sortie against convoy JW.51B. Sinks British minesweeper HMS BRAMBLE and destroyer HMS ACHATES and damages destroyers HMS ONSLOW and OBEDIENT. Hit by three shells from British cruisers HMS SHEFFIELD and JAMAICA. Two boiler rooms flooded, speed reduced to 15 knots. Retires to Alta.
January 1943: Temporary repairs at Alta from repair ship NEUMARK.
23 January 1943: Transferred to Bogen.
7 February 1943: Transferred to Kiel with KÖLN.
11 February 1943: Began repairs at Wilhelmshaven.
April 1943: Towed to Pillau (now Baltiysk, Russia) to complete repairs, due to danger of air raids at Wilhelmshaven.
1 March 1944: Recommissioned as training ship with only two (of three) operational boiler rooms.
26 October 1944: Assigned shore bombardment duty.
15 January 1945: Arrived at Gotenhafen for repairs.
30 January 1945: Took on 1500 refugees and departed Gotenhafen.
2 February 1945: Docked at Kiel.
3 April 1945: Hit by bomb at Kiel.
9 April 1945: Hit by three bombs at Kiel.
3 May 1945: Scuttled at Kiel.
July 1945: Refloated, towed to Heikendorf Bay and beached.

BLÜCHER:

20 September 1939: Commissioned.
7 April 1940: Assigned to Group 5 (Oslo) for Operation WESERÜBUNG. Loads troops at Swinemünde.
9 April 1940: Hit by Norwegian 28 CM (11-inch) shells and two torpedoes in Drobak Narrows, capsizes, and sinks.

PRINZ EUGEN:

1 July 1940: Hit by two small bombs while completing post-launch fitting out at Kiel.
18 May 1941: Leaves Gotenhafen with BISMARCK on Operation RHEINÜBUNG (RHINE EXERCISE).
21 May 1941: Put in at Korsfjord, Norway to refuel PRINZ EUGEN (but not BISMARCK); sighted by RAF.
24 May 1941: Battle in Denmark Strait. British battlecruiser HMS HOOD sunk (some theorize that it was hits by PRINZ EUGEN that caused the sinking) and battleship HMS PRINCE OF WALES damaged. BISMARCK damaged; PRINZ EUGEN detached. Later fire in boiler room controlled.
26 May 1941: Refueled from SPICHERN; attempted repair to boilers.
28 May 1941: Refueled from ESSO HAMBURG. Further boiler problems.
29 May 1941: Reported that none of three turbine sets was fully operational. Ordered to abort mission.
1 June 1941: Arrived Brest, France.
2 July 1941: Hit by bomb while in dock at Brest.
11-13 February 1942: Operation CERBERUS ('Channel Dash') with battleships SCHARNHORST and GNEISENAU.
21 February 1942: Transferred to Norway with ADMIRAL SCHEER.
23 February 1942: Off Trondheim, torpedoed in stern by British submarine HMS TRIDENT. Docked in Lofjord near Trondheim.
March 1942: Temporary repairs by repair ship HUASCARON.
16-18 May 1942: Operation ZAUBERFLÖTE (MAGIC FLUTE), transferred to Kiel for permanent repairs.
11 January 1943: Operation FRONTTHEATER (FRONT THEATER), transfer to Norway with SCHARNHORST aborted when spotted in Skagerrak by RAF.
25 January 1943: Operation DOMINO, second attempt at transfer to Norway also aborted.
May 1943: Assigned training duty in Baltic.
7-28 June 1944: Cruised off Finnish coast to cover German withdrawal from Finland.
20 August 1944: Fire support at Tukkum (Tukums) in Gulf of Riga.
6-13 October 1944: Fire support at Memel (Klaipeda).
15 October 1944: Collision with light cruiser LEIPZIG, minor damage to bow.
20-21 November 1944: Fire support at Swörbe Peninsula, Ösel (Saaremaa) Island.
29-30 January 1945: Fire support near Königsberg (Kaliningrad) and Pillau.
10 March 1945: Fire support near Danzig (Gdansk).
8 April 1945: Transferred to Copenhagen.
9 May 1945: Surrendered.
24-26 May 1945: Transferred to Wilhelmshaven.
December 1945: Transferred to United States Navy, renamed USS PRINZ EUGEN (IX-300).
January-June 1946: Transferred to Pacific for Operation CROSSROADS atomic bomb tests.
1 July 1946: Able Test of Operation CROSSROADS at Bikini Atoll, Marshall Islands. Minor damage.
25 July 1946: Baker Test at Bikini Atoll. Minor underwater damage.
22 December 1946: Capsized at Kwajelein Atoll, Marshall Islands.



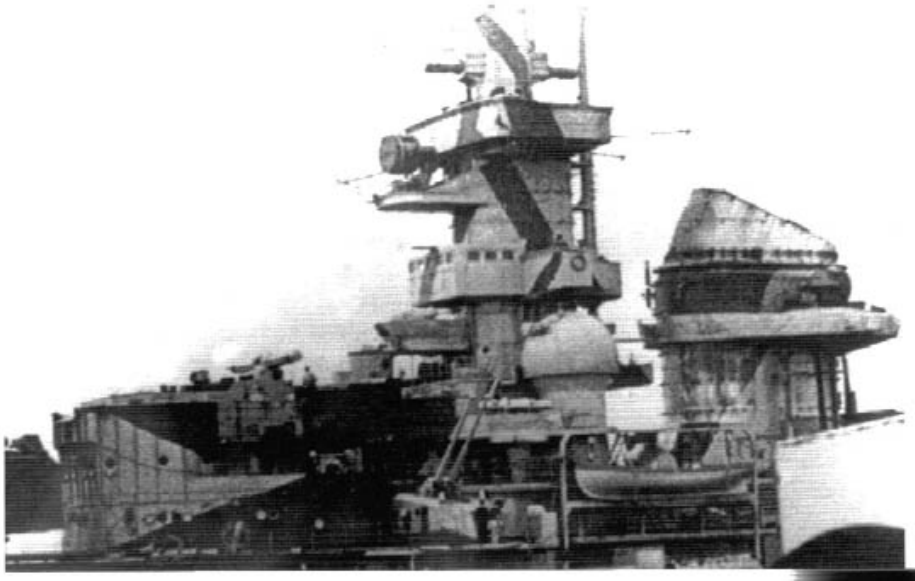
Looking forward along the port side of ADMIRAL HIPPER, in dock after Operation WESERÜBUNG (WESER EXERCISE), the German invasion of Norway in May of 1940. The control station for the after port torpedo tubes is in the foreground. Forward of that is one of the 10.5 CM twin mounts and then the crane for aircraft handling in stowed position. The mushroom-shaped cover for the *Flak* fire control director is located under the bridge wing. (NARA)

ADMIRAL HIPPER's main battery is trained towards the photographer while berthed in Kiel in May of 1940. She shows no trace of the camouflage in the last two views, so it was either taken before the scheme was applied or after it was painted out. It was not uncommon for camouflage schemes or turret top colors to be applied for specific operations and painted out as soon as the operation was completed. The towers seen above her forward superstructure are on land and were not part of the ship. (NHC)

ADMIRAL HIPPER lies at anchor in Brest, France in early 1941. She had just completed Operation NORDSEETOUR (NORTH SEA TOUR), a commerce raiding mission that originated at Brunsbüttel, Germany on 30 November 1940. ADMIRAL HIPPER sank one merchant ship and damaged one British cruiser and two troopships before putting into Brest on 27 December 1940. Dark Blue-Gray was painted over her standard Medium and Light Gray wartime scheme. (Via Bob Cressman)

ADMIRAL HIPPER is anchored in Kieler Förde in early June of 1940. She retained the paint scheme that resulted from painting out her earlier camouflage. The turret tops now appear darker, probably Dark Gray. It is known that at this time the Royal Navy was painting turret tops Yellow in order to confuse the *Luftwaffe* and that the *Kriegsmarine* responded by switching from Yellow to Dark Gray.

ADMIRAL HIPPER's Dark Blue-Gray camouflage extended to her foretop and funnel. This camouflage was applied prior to breaking out into the North Atlantic on Operation NORDSEETOUR (NORTH SEA TOUR). The radar antenna mounted above the foretop rangefinder always appears to be facing one beam or the other. Because the antenna was fixed to the rangefinder, it was not used to regularly sweep the horizon. Most of the time, it was turned off and the antenna pointed to the side to protect it from the elements as much as possible. (Via Bob Cressman)

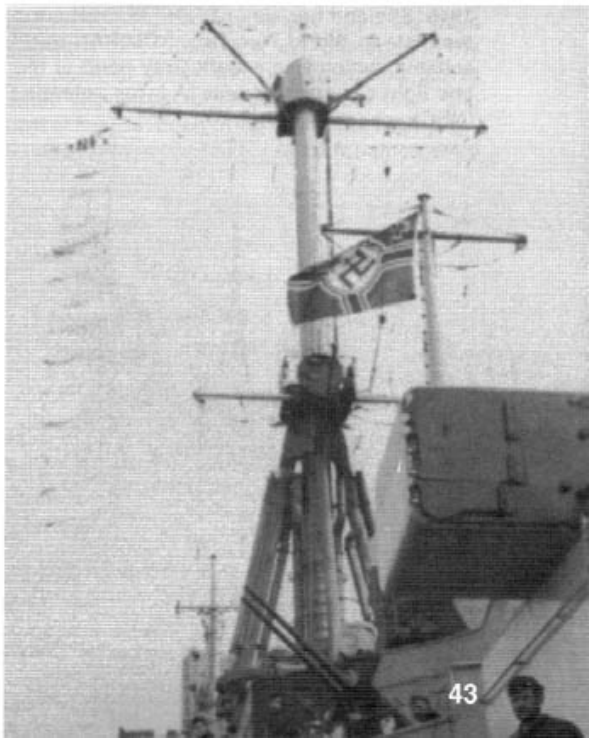


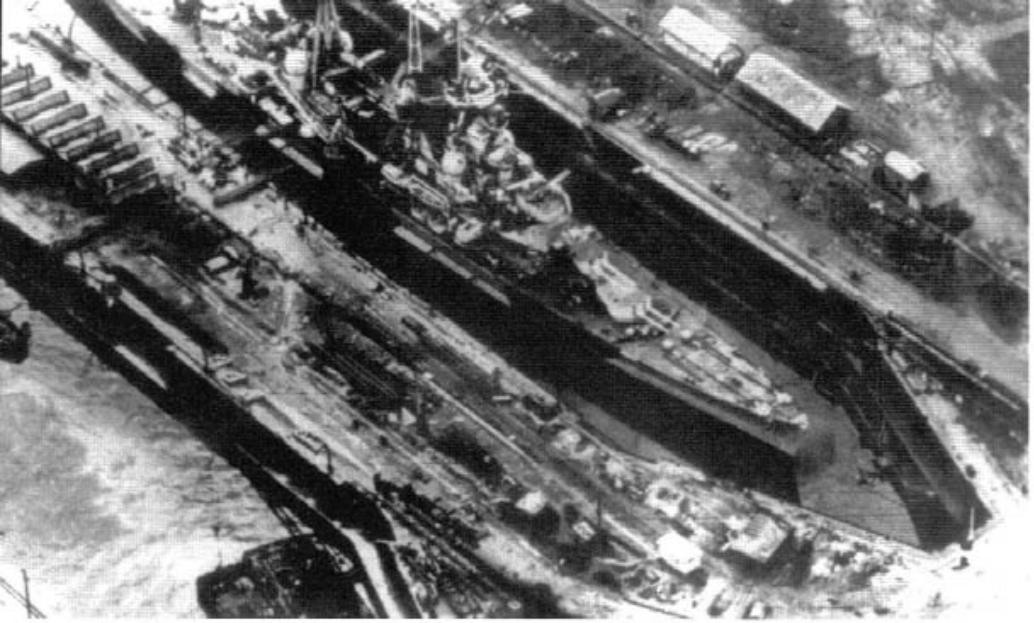
ADMIRAL HIPPER steams off Brest in early 1941, after her engines were repaired. The Dark Blue-Gray splinters were applied on the starboard hull and superstructure in a mirror pattern to that on her port side. ADMIRAL HIPPER's A (*Anton*) and B (*Berta*) main gun turrets are trained to port. (Via Bob Cressman)

ADMIRAL HIPPER scored big during her second Atlantic raid. On 12 February 1941, she found the unescorted Allied convoy SLS.64, sinking seven of 19 ships (32,806 tons) and damaging at least four more. ADMIRAL HIPPER's 10.5 CM (4.1-inch) *Flak* battery dispatches one of her victims. After action reports indicated that her results might have been even better, except that hoist failures repeatedly interrupted ammunition supply to the heavy *Flak* guns. (NHC)

Two crewmen inspect one of ADMIRAL HIPPER's rangefinders while she is cruising in the North Atlantic during the Spring of 1941. One of the sailors is looking into the eyepiece. He matched images from each of the objective lenses. When they overlapped, the other crewmen read the range off the dials on the side of the mount. (BAK)

The *Kriegsmarine* ensign flies from a flagstaff near ADMIRAL HIPPER's mainmast. Fourteen pennants flying from her yardarms symbolize ships the cruiser claimed to have sunk during her cruise from February to March of 1941. Postwar analysis of records indicated that ADMIRAL HIPPER actually sank only seven ships on this raid. A twin barreled 3.7 CM *Flak* cannon is mounted on the port side just aft of the mainmast. An optical rangefinder hood projects from the starboard side of C (*Cäsar*) main turret, which is seen to the right. (BAK)



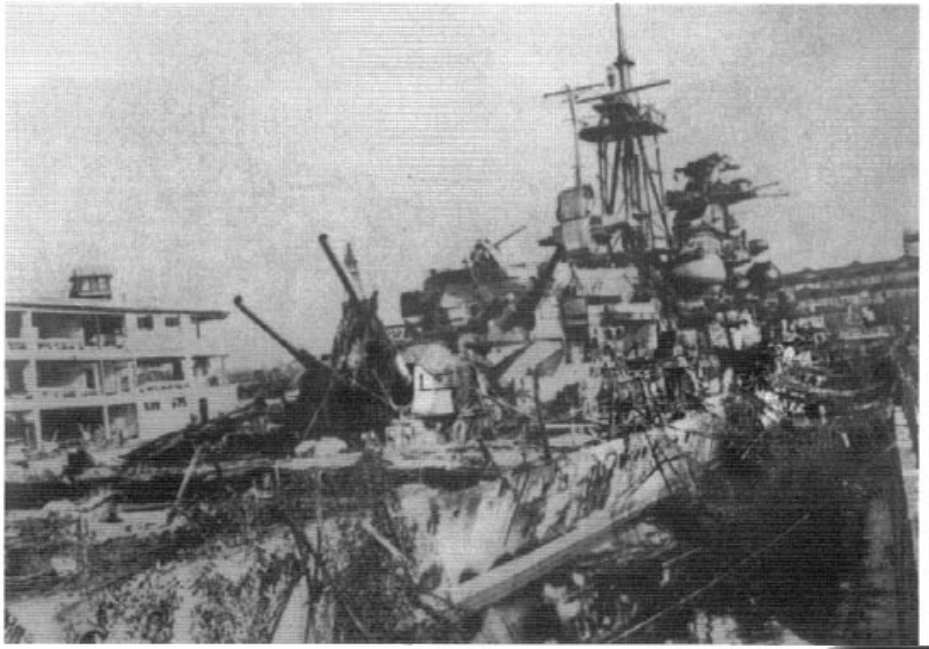


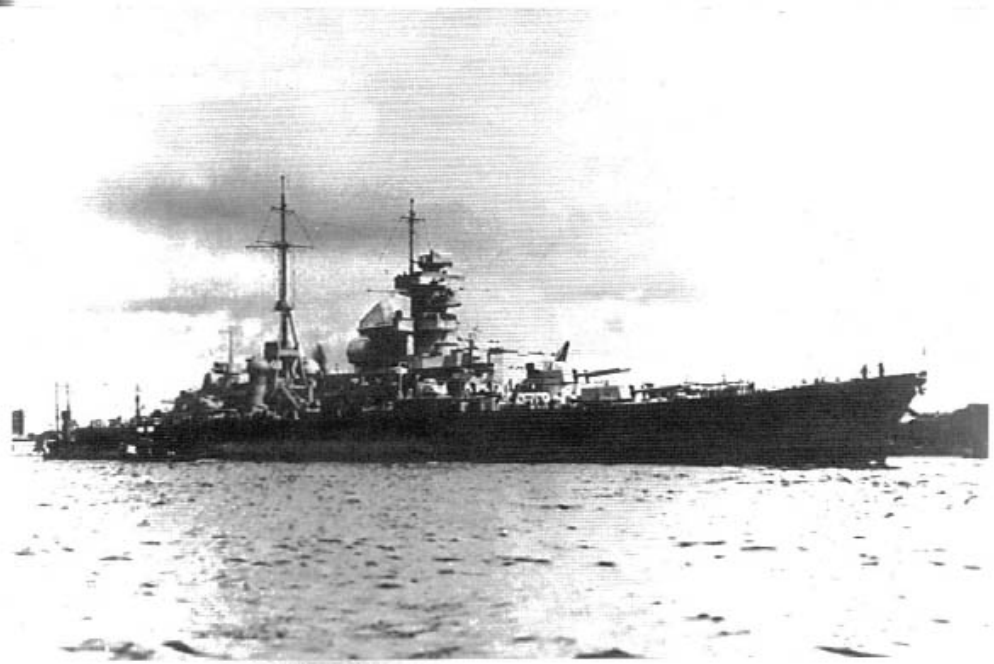
ADMIRAL HIPPER entered drydock on returning to Brest for repairs in late December of 1940. She remained there until March of 1941. RAF bombers attacked ADMIRAL HIPPER several times during this period, but the cruiser survived without damage. (Via Bob Cressman)

ADMIRAL HIPPER is anchored in a Norwegian fjord in 1942. Her bow and stern are painted Light Gray while the rest of her hull is Medium Gray and Dark Blue-Gray. The superstructure is camouflaged in Dark Blue-Gray and Light Gray. This camouflage does little to hide the ship when she is brightly lit on a calm sea. (NHC)

This fair quality image shows ADMIRAL HIPPER operating in the Baltic Sea in January of 1945. She and her sister PRINZ EUGEN supported retreating German forces in the Baltic area late in World War Two. ADMIRAL HIPPER is camouflaged in the standard late-war scheme, which was a Dark Gray band at the waterline, the rest of the hull medium gray and light gray upperworks. A large antenna for the FuMO 26 is mounted on the foretop. (NHC)

ADMIRAL HIPPER ended the war in derelict condition at Kiel. Four large bombs hit her in early April of 1945. Although still afloat, she was determined to be of no further value. Her seacocks were opened and she was allowed to settle on the bottom in her drydock in early May.



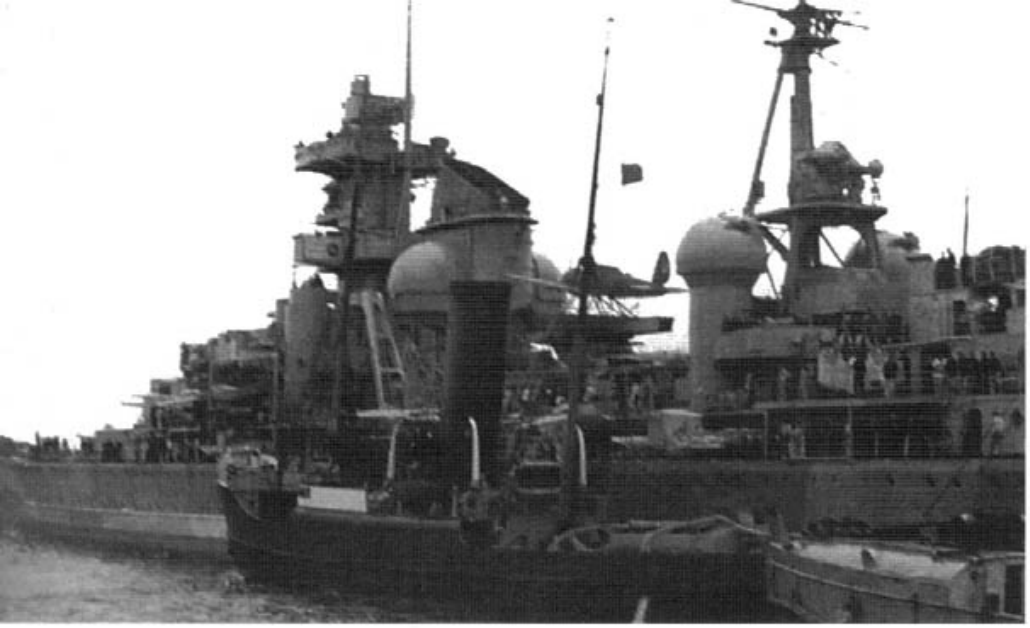


PRINZ EUGEN represented the apex of *Kriegsmarine* cruiser design when she was commissioned on 1 August 1940. She was large and with a better range than either ADMIRAL HIPPER or BLÜCHER. Following commissioning, PRINZ EUGEN began working up in the Baltic alongside her 'big sister' BISMARCK for their planned Atlantic raid, Operation RHEINÜBUNG (RHINE EXERCISE). (NARA)

A detail of sailors paint one of PRINZ EUGEN's main turrets while at Korsfjord, Norway on 21 May 1941. A heavy coat of Light Gray is being applied over her old Dark Gray finish. PRINZ EUGEN put into Korsfjord with BISMARCK that day prior to breaking out into the North Atlantic on Operation RHEINÜBUNG. (NHC)

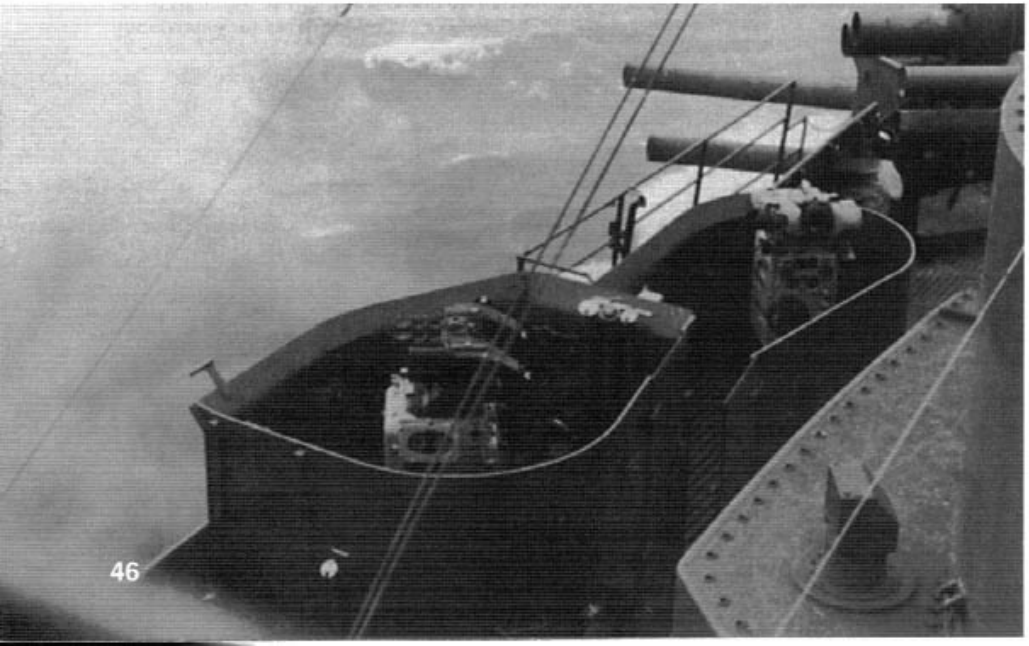
A gunnery officer covers his ears while one of PRINZ EUGEN's 10.5 CM (4.1-inch) guns fires during a shakedown cruise. These weapons were primarily for anti-aircraft use, but were also employed against surface targets on occasion. A wire basket for catching spent shells is attached to the near 2 CM *Flak* cannon. (BAK)

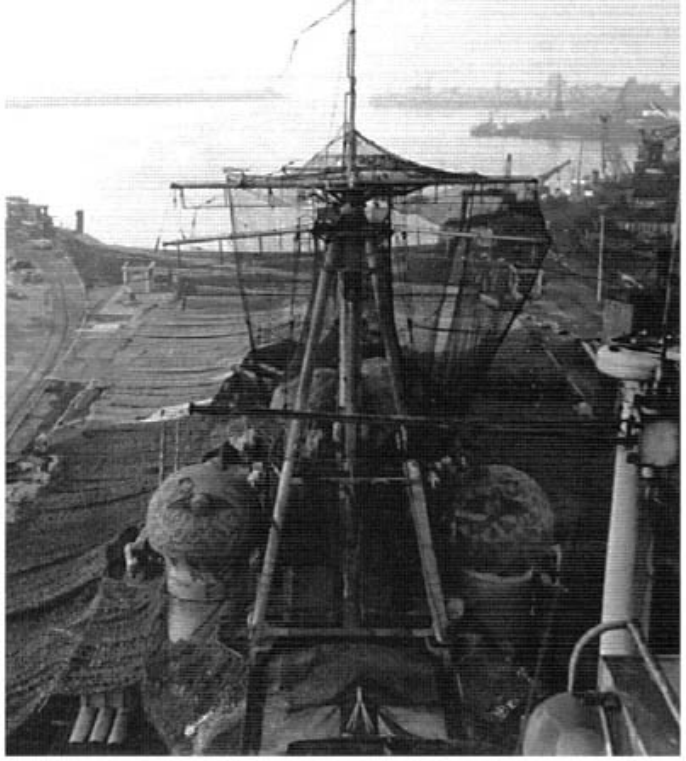
A tugboat assists PRINZ EUGEN when the cruiser put into Brest on 1 June 1941. She and BISMARCK departed Gotenhafen for Operation RHEINÜBUNG on 18 May 1941. Six days later, the British battlecruiser HMS HOOD was sunk and BISMARCK was damaged in the Denmark Strait. Bad luck (from the German point of view) and poor planning led to BISMARCK's loss. Less well known is what happened to PRINZ EUGEN after she detached from BISMARCK on 24 May. The cruiser had so much trouble with her high-pressure boilers that the raid was cut short and PRINZ EUGEN headed for Brest for emergency repairs. (NHC)



PRINZ EUGEN lies at anchor at Brest after her arrival on 1 June 1941. A tugboat alongside the cruiser guided her into the harbor. PRINZ EUGEN's scheme during Operation RHEINÜBUNG was similar to that of BISMARCK. Shades of gray were painted over her Dark Gray bow and stern, Black and White hull and superstructure bands, and the Red (Baltic theater) main turret tops. (NHC)

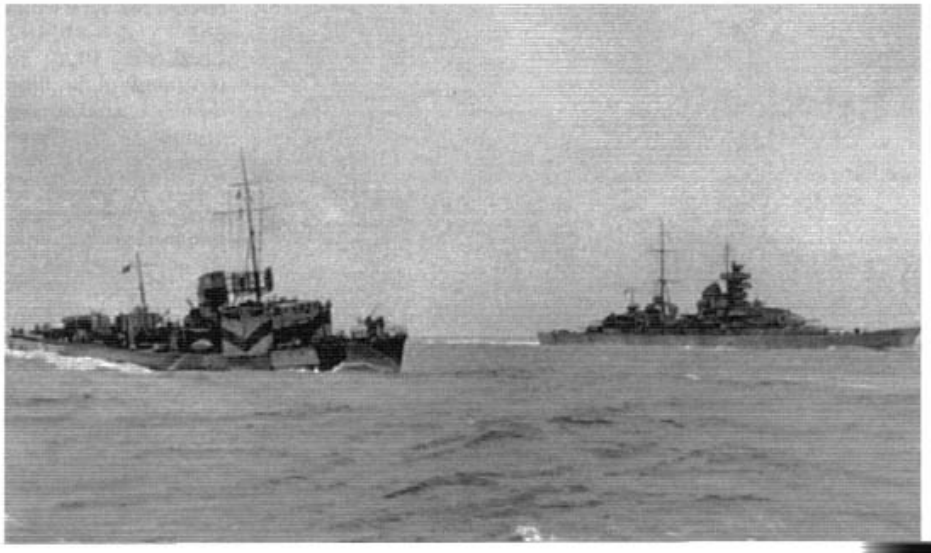
Looking forward on the port side, two tubs contain targeting optics for PRINZ EUGEN's light *Flak* battery. The conning tower is to the right with tubes protecting the lenses of its 6 M basis main battery rangefinder. The barrels of B main turret project in the background. (BAK)

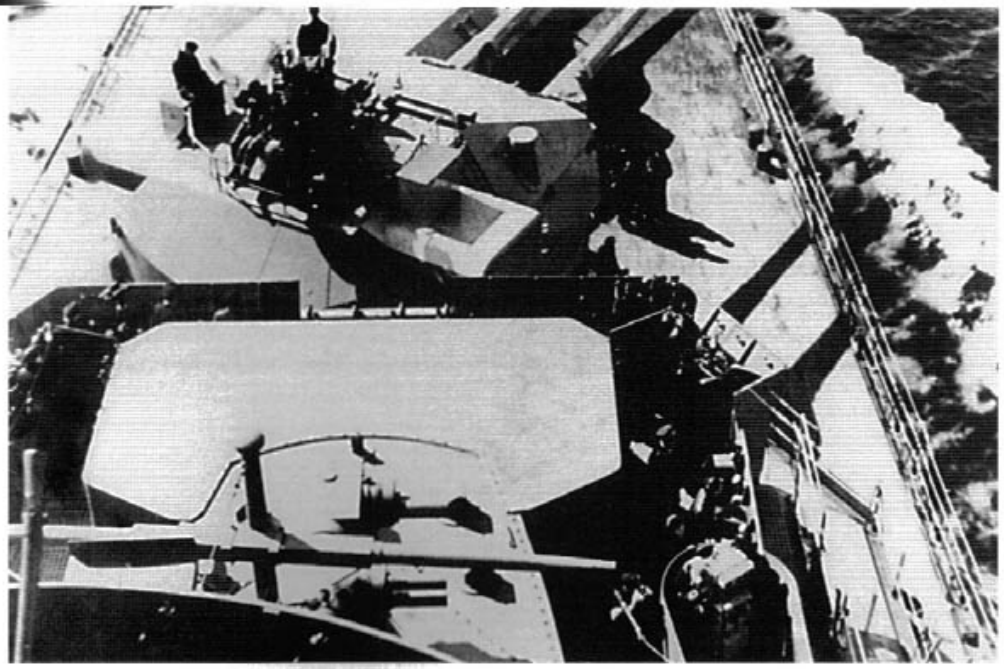




PRINZ EUGEN's topmasts were lowered and camouflage netting draped over her masts and superstructure while she was berthed in Brest. This made it harder for the British Royal Air Force (RAF) to find and hit her. British bombs only hit PRINZ EUGEN once, in July of 1941. (NHC)

The safety of German major surface units at Brest – PRINZ EUGEN and the battleships SCHARNHORST and GNEISENAU – became increasingly uncertain as the Allies gained air superiority over the French coast. Finally accepting the inevitable, the Germans pulled these three ships back to Germany in February of 1942. Operation CERBERUS, the 'Channel Dash,' was a major tactical success and an acute embarrassment to the British, but acknowledged as a strategic defeat. PRINZ EUGEN is accompanied by a torpedo boat – possibly T13 – while passing through the English Channel on 12 February 1942. She was the only one of the major German ships to reach Germany undamaged, as both SCHARNHORST and GNEISENAU hit mines before reaching home waters. (NHC)

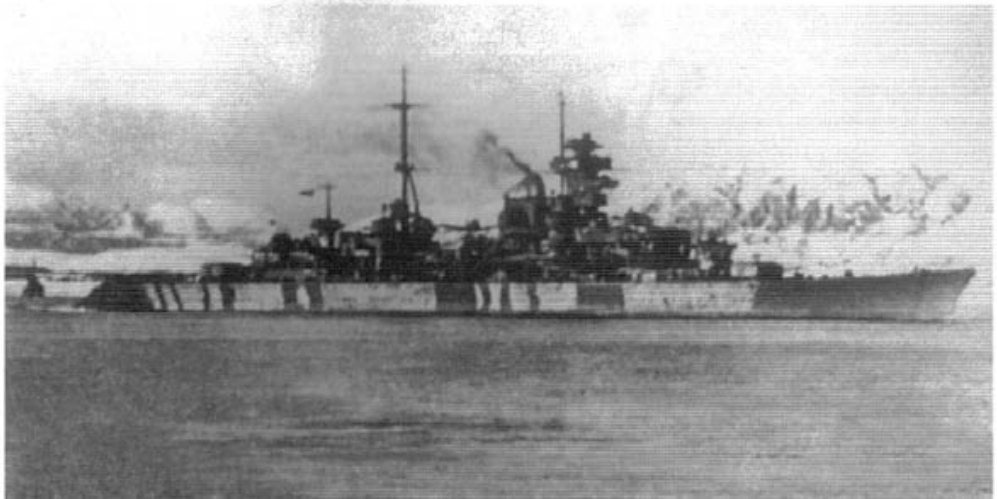




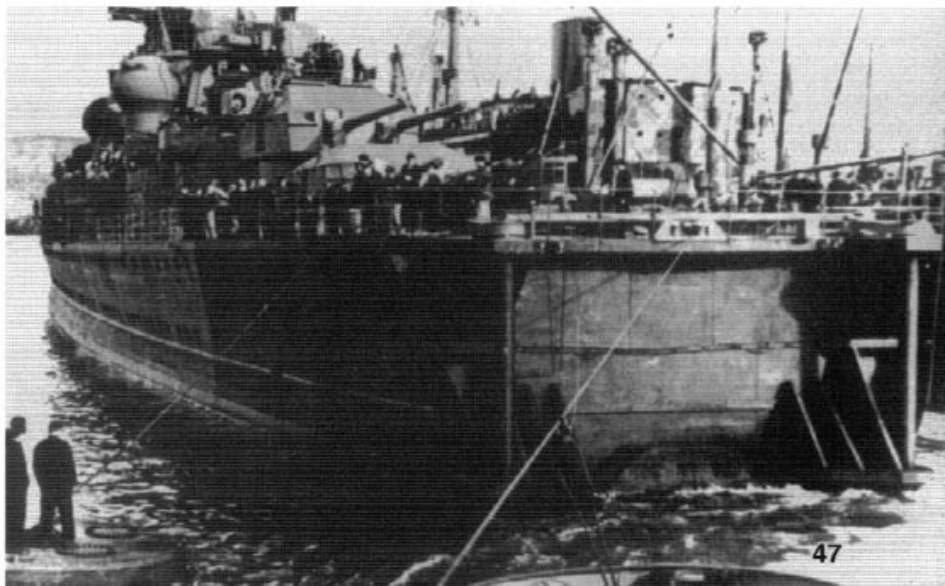
Prior to Operation CERBERUS, PRINZ EUGEN received five 2 cm quad mounts to boost her anti-aircraft armament. One mount was installed atop her B main turret. Additional quad 2 cm guns were installed on her forecastle, a platform on her upper forward mainmast section, atop C turret, and on her quarterdeck. (Author)

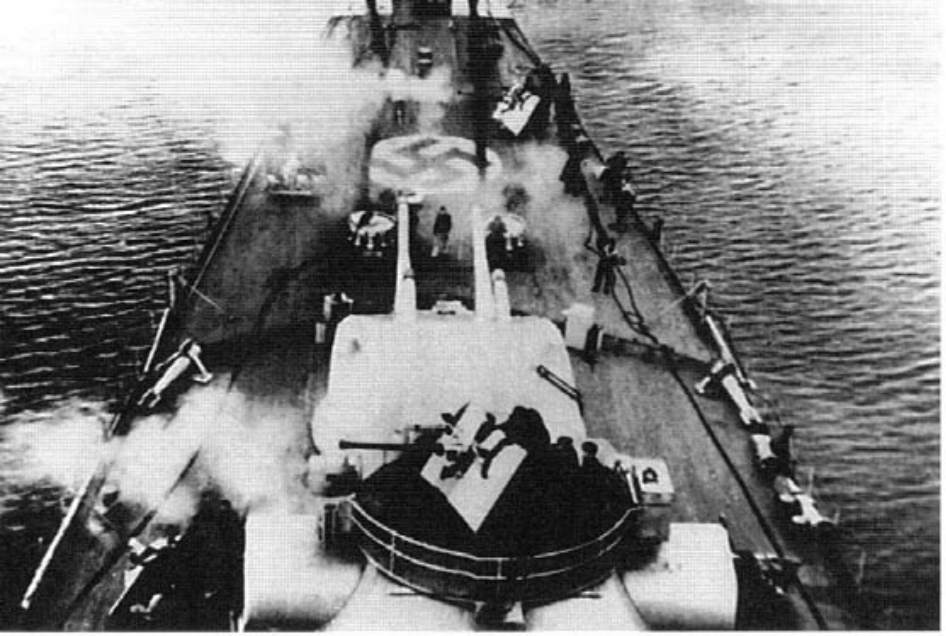
Both anchors are raised just above the water while PRINZ EUGEN is berthed in Norway in early 1942. The ADMIRAL HIPPER Class also had provision for a third anchor at her stem, but this was not carried at this time. Her B turret is trained to port. (Author)

PRINZ EUGEN stayed at Brunsbüttel, Germany only long enough to resupply and then left for Norway on 20 February 1942. Three days later, her luck ran out and she took a torpedo right aft from the British submarine HMS TRIDENT. The explosion ripped off PRINZ EUGEN's rudder and collapsed the long stern overhang, but left the screws undamaged. She was able to limp into Trondheim, Norway under her own power. These views show the collapsed stern and the interesting camouflage she had painted up while at Brunsbüttel. The scheme appears to be Light Gray and Dark Blue-Gray, but was most likely a three-color scheme of Light Gray with Medium Gray and Dark Blue-Gray on the superstructure. (NHC)

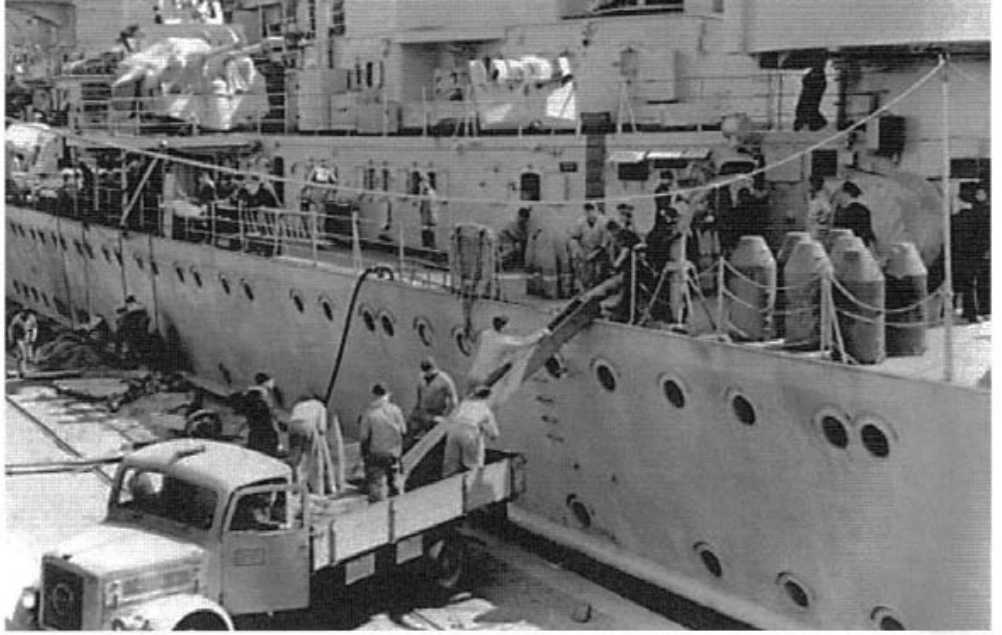


PRINZ EUGEN's jury-rigged stern is seen after her return to Kiel in May of 1942. Steering was done by muscle power, with the rear capstan rigged up to the two rudderposts, one on each side of the stern. On orders from the bridge, 20-plus men would heave at the capstan, a practice that was reminiscent of days long past. (NHC)





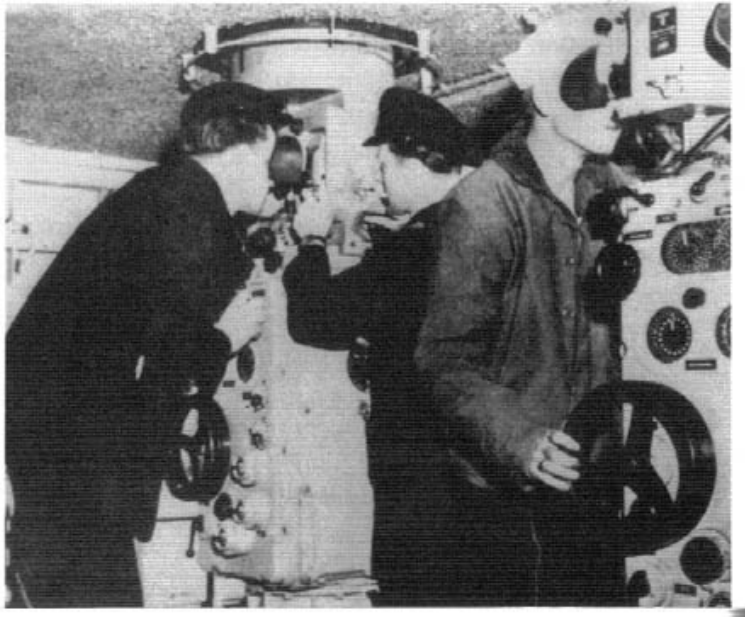
The Germans replaced the 2 CM quad cannon atop PRINZ EUGEN's B turret with a single 4 CM Bofors *Flak* 28 cannon in early 1945. Additional 4 CM cannon replaced many of her 2 CM and 3.7 CM guns at that time. The Swedish-designed Bofors gun was built in Norway for the *Kriegsmarine*. Its 120 rounds per minute (RPM) firing rate was four times the 3.7 CM SK C/30's 30 RPM firing rate. (NHC)

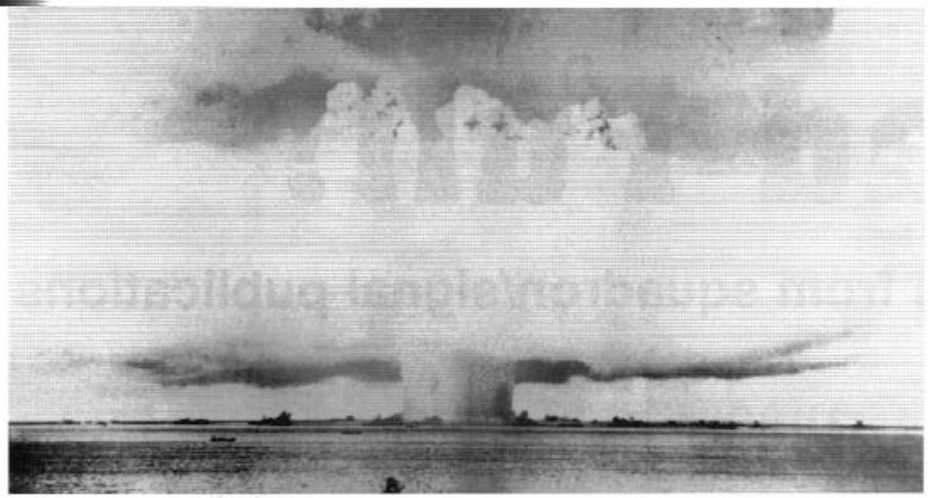


PRINZ EUGEN surrendered intact at Copenhagen, Denmark on 9 May 1945. To make sure she really couldn't fight again, the Allies's first act was to order that all ammunition for all weapons be off loaded. Sailors slide 20.3 CM (8-inch) shells down a chute to a waiting truck. A 4 CM Bofors *Flak* 28 is seen immediately above the truck. (NHC)

PRINZ EUGEN rides at anchor following her surrender at Copenhagen in May of 1945. Large antennas for the FuMO 26 and FuMo 27 radars are fixed to the fore and aft rangefinders, respectively, while a fully rotating FuMO 25 antenna is placed on the mainmast platform. These were all variants of the same radar design, which operated at the 81.5 CM wavelength. Just discernable is the antenna for the FuMO 81 *Berlin-S* at the head of the foremast, which operated at the 6 CM wavelength. It was based on the Magnetron (high powered microwave generator) tube captured when an RAF Avro Lancaster bomber crashed at Rotterdam, the Netherlands in 1943.

A US sailor (right) and two German sailors occupy one of PRINZ EUGEN's rangefinder stations after her surrender. They are peering through the optical rangefinders used to calculate target ranges for the cruiser's weapons. The United States won a lottery among the Allies to claim PRINZ EUGEN as a prize. She was commissioned as USS PRINZ EUGEN (IX-300) on 5 January 1946. (NHC)



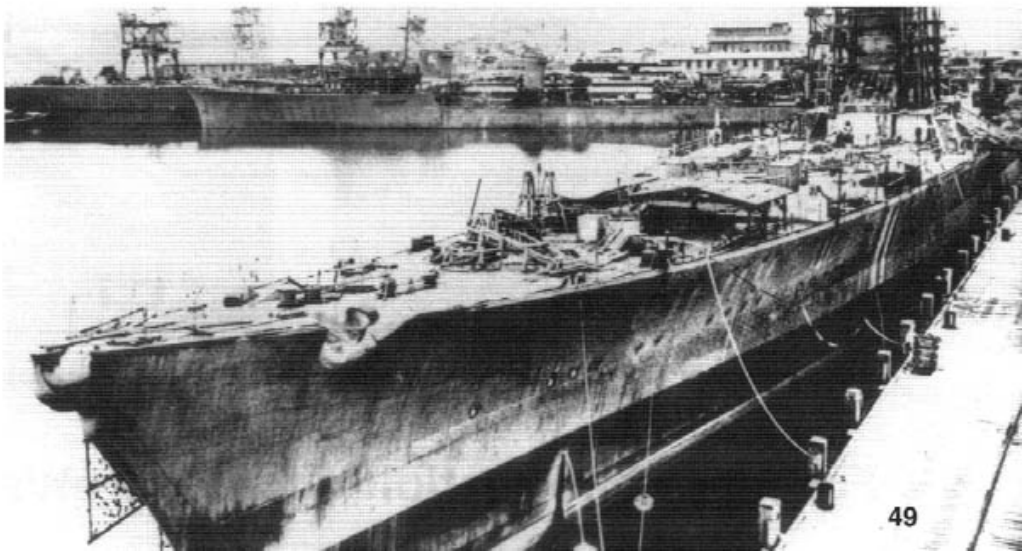


Unlike Germany's late war U-boats, which incorporated technology new to the Allies, the US Navy quickly discovered they had nothing to learn from their new prize. They assigned USS PRINZ EUGEN to be a target for Operation CROSSROADS in July of 1946. This was the US Navy's series of atomic bomb tests that were conducted at Bikini Atoll in the Marshall Islands, which are located in the Central Pacific Ocean. PRINZ EUGEN was among 94 target vessels for these tests, which included two captured Japanese warships and various US vessels ranging from landing craft to aircraft carriers. On 1 July, a 23 kiloton (Kt) bomb dropped from a Boeing B-29 Superfortress detonated 520 feet (158.5 M) over Bikini Lagoon in Test Able. This caused no appreciable damage to PRINZ EUGEN, which was anchored well away from Ground Zero. Test Baker was a 23 Kt device detonated 90 feet (27.4 M) underwater on 25 July. This explosion raised a huge column of radioactive water into the mushroom cloud. (NHC)

US sailors hose down PRINZ EUGEN with water from Bikini Lagoon on 1 August 1946. She was basically intact after Test Baker on 25 July, although she slowly took on water from sea valves that had been sprung by the underwater blast's enormous overpressure. All the ships in the blast area were found to be covered with radioactive debris from the harbor bottom. Efforts to hose down these ships only proved to make matters worse. Eventually, it was decided to tow PRINZ EUGEN southeast from Bikini to Kwajelein Atoll, where she sank on 22 December 1946. (NHC)

This RAF reconnaissance photograph shows SEYDLITZ docked at the Deschimag yard in Bremen, Germany on 8 May 1942. She is approximately 95 percent complete. All four turrets are in place and no major equipment seems to be missing. Nevertheless, the Germans decided to convert her to a small aircraft carrier, which involved removing her upperworks and adding a flight deck. (NHC)

Conversion of SEYDLITZ into an aircraft carrier was underway when she was photographed on 3 February 1943. Early work in adding a flight deck and other carrier-related equipment went quickly. The Germans halted further work on SEYDLITZ in January of 1943. She was towed to Königsberg in 1944, where Soviet forces captured the unfinished ship. SEYDLITZ was scrapped during the 1950s. The destroyer seen in the background is Z32, which was started at Germaniawerft, Kiel, but completed at the Bremen yard. (Via Ken Macpherson)



All Ahead Full!

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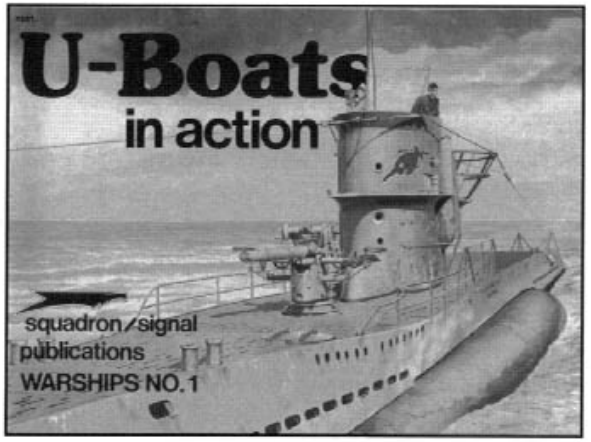
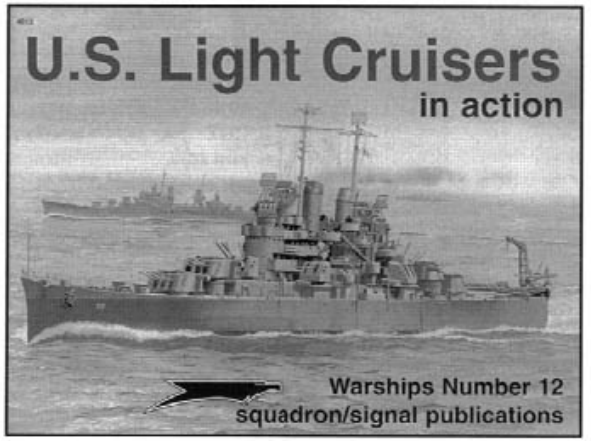
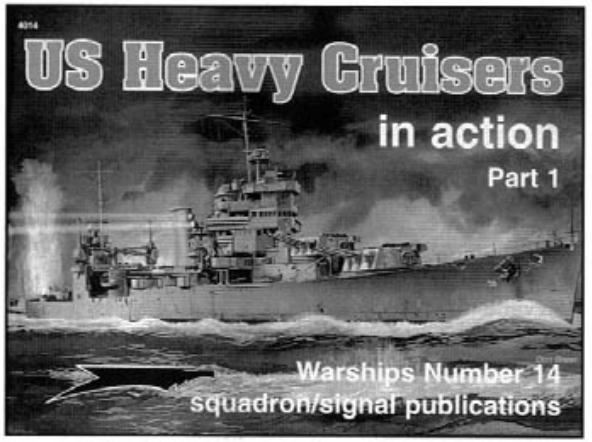


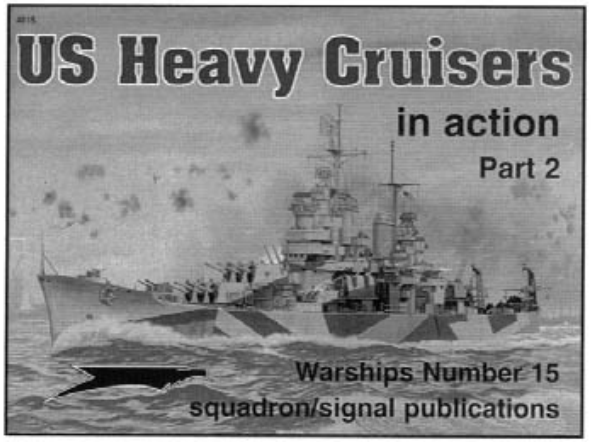
4001 U-Boats



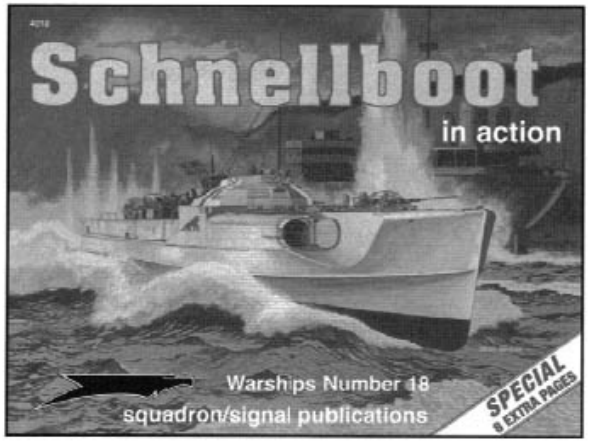
4012 US Light Cruisers



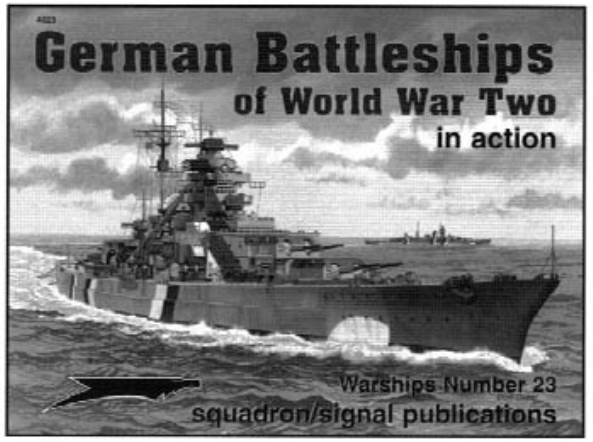
4014 US Heavy Cruisers, Part 1



4015 US Heavy Cruisers, Part 2



4018 Schnellboot



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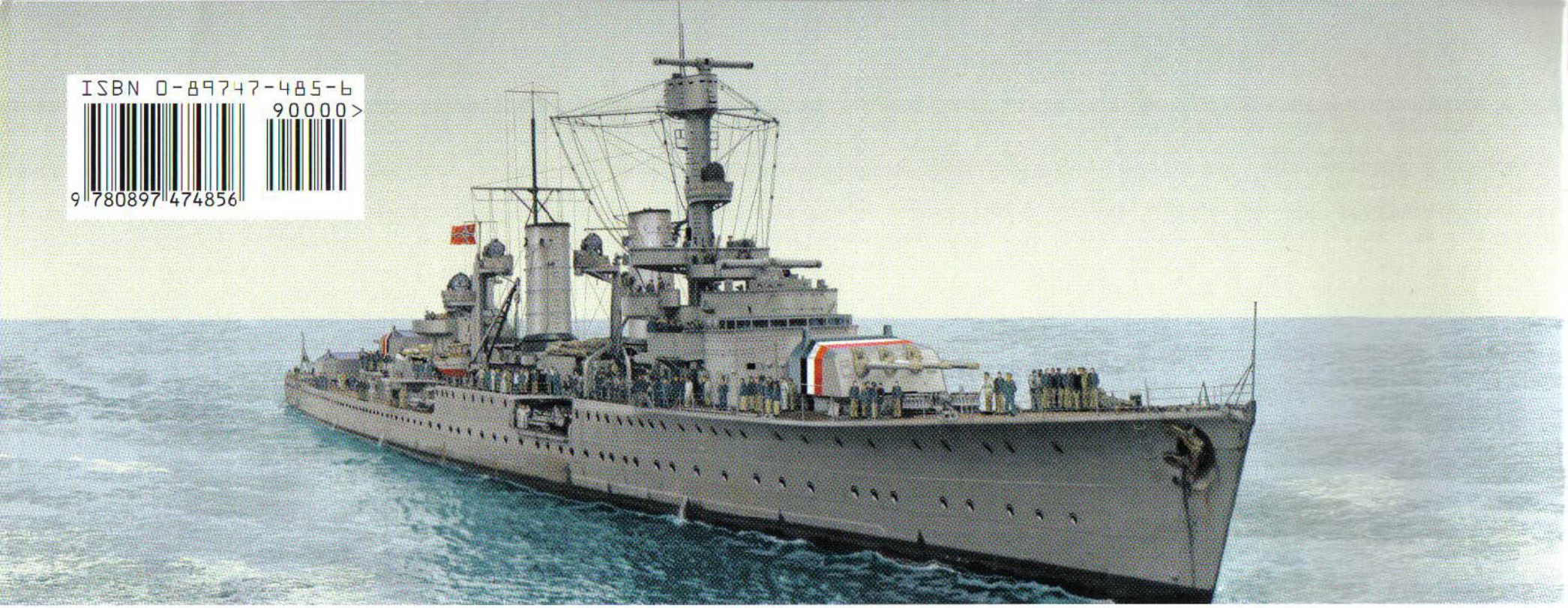
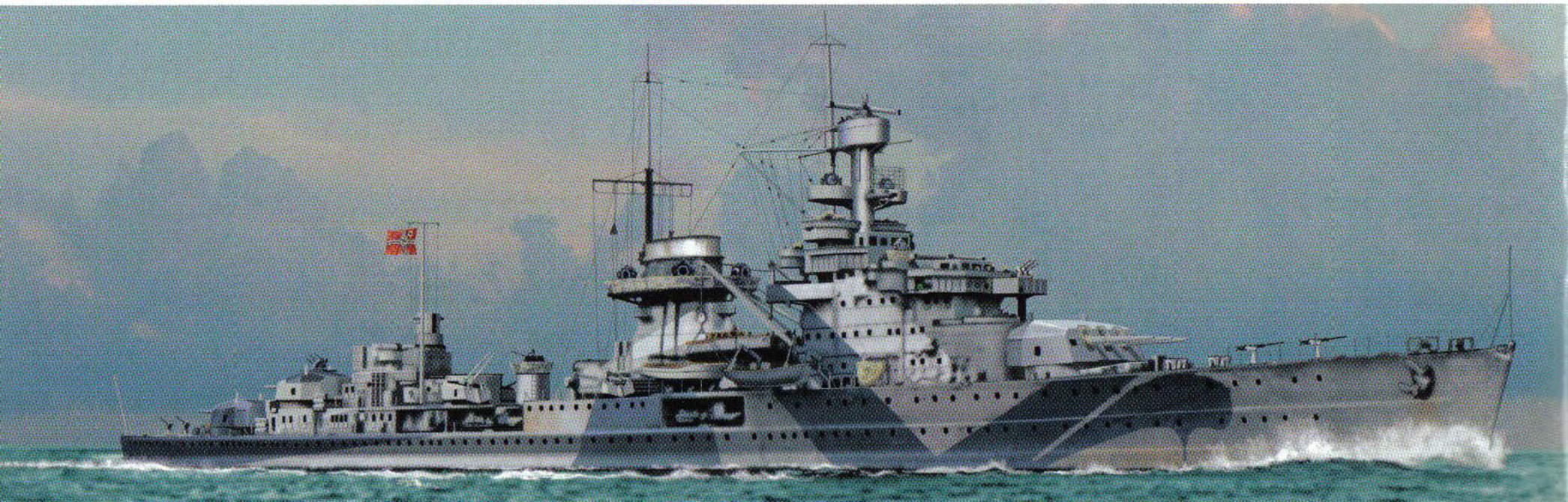


(Above) The 'K' Class light cruiser KÖLN lies off the Spanish coast in 1937. Neutrality Patrol bands are painted on her main turrets during the Spanish Civil War.

(Below) NÜRNBERG patrols in the Atlantic off Norway during the Spring of 1943. Medium Gray and Dark Blue-Gray splintering is painted over the Light Gray hull and Medium Gray superstructure.